JERSEY DOT'S
"Turning Problems into Solutions"
Tech Brief

Stormwater Management Rule Implementation Process

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RESEARCH RATIONALE

The N. J. Department of Environmental Protection's Stormwater Management Rules (N.J.A.C. 7:8), adopted on February 2, 2004, has created more stringent storm water management standards for land developments in the state, including roadway and other transportation projects. These Rules include requirements for groundwater recharge and both stormwater quality and quantity control. A Stormwater Best Management Practices (BMP) Manual was developed by the NJDEP to assist regulated agencies such as the NJDOT with Rule compliance. However, the BMP Manual lacks sufficient guidance to properly lead engineers to identify applicable regulations and select appropriate storm water management measures for transportation projects.

As a result, NJDOT planners, designers, and maintenance personnel need a simplified process to navigate the Stormwater Management Rules and facilitate the selection of appropriate stormwater management measures. This process should also assist NJDOT personnel in determining during early project stages whether all of the requirements of the Rules can be met for a specific project or whether hardship waivers will be necessary.

RESEARCH OBJECTIVES

Develop an electronic decision process to assist planners, designers and maintenance staff to

- Determine applicable stormwater rules.

- Identify the appropriate treatment train of non-structural and structural stormwater strategies and measures including manufactured treatment devices to comply with the Stormwater Rules.
- Consider treatment capacity, footprint (Right of Way requirements), cost, frequency of maintenance and operating cost.

WORK PERFORMED

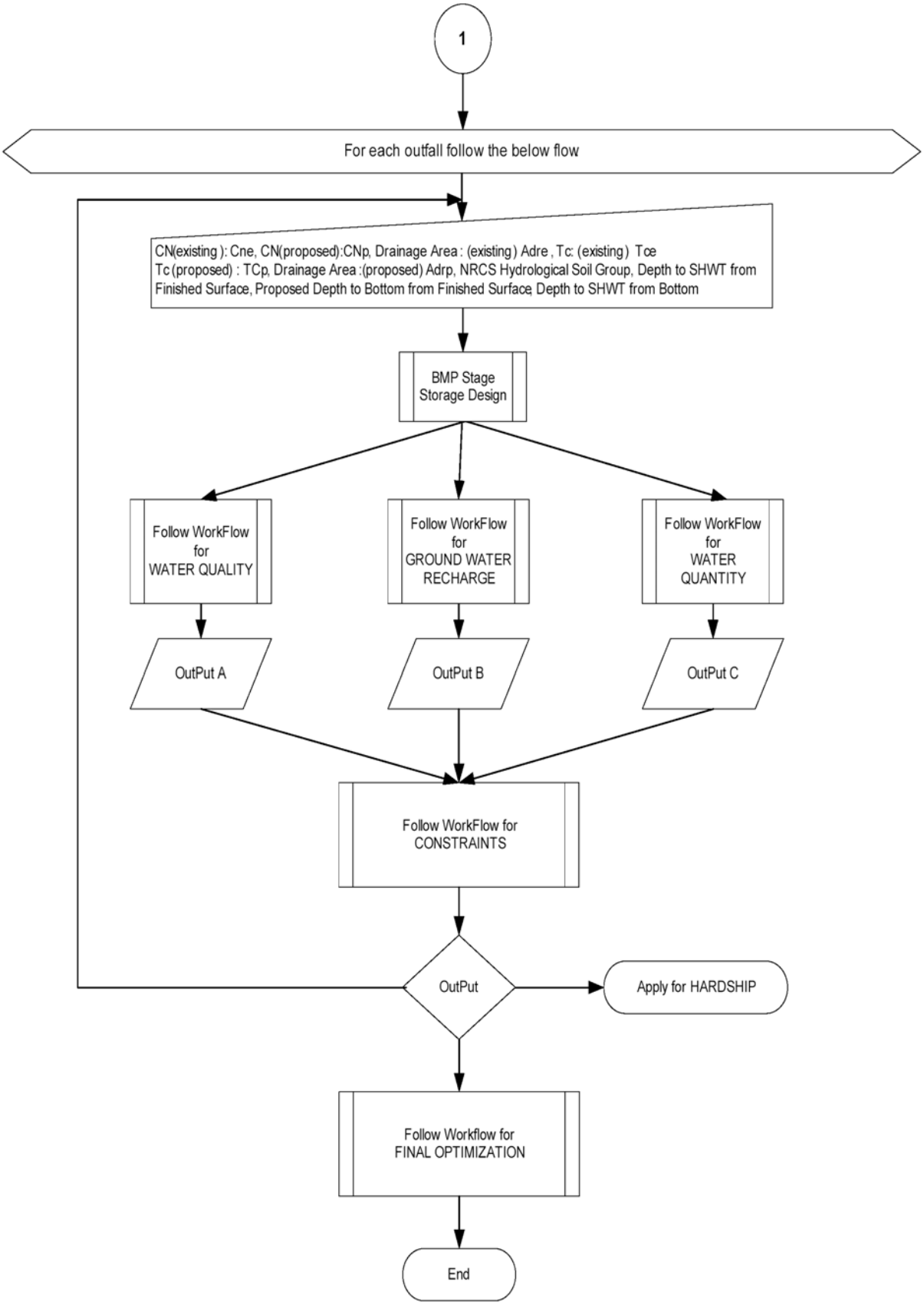
Development of the computer program began with an exhaustive literature search of stormwater management standards and Best Management Practices (BMPs), with specific emphasis on how they are being applied to roadway and other linear transportation projects. This search included various state regulations, books, and research papers on these topics, including the New Jersey Best Management Practices (BMP) Manual. The results of this search indicate:

1) While technically sound, the New Jersey BMP Manual does not provide adequate guidance in the selection of appropriate BMPs for roadway projects.
2) The California Best Management Practice Handbook provides a good decision tree and check lists that could be used as the basis for the computer software.
3) The Washington Highway Runoff Manual provides helpful guidance in the selection and planning of BMPs.
4) The Western Washington Stormwater Management Manual gives a step-by-step procedure for developing stormwater pollution prevention plans.
5) The Georgia Stormwater, Vol. 2 provides a BMP maintenance checklist.
6) Other documents of interest included the Maryland, Missouri, and Idaho BMP Manuals.

From these results, it was recommended that the New Jersey BMP Manual be used as both the technical and regulatory basis of the new computer program, with additional technical guidance derived from other search documents, particularly the Maryland BMP Manual.

Following the literature search, a questionnaire was sent out to 8 regulators and 10 consultants to collect expert input. From the questionnaire responses, it was determined that the two biggest problems design were a shallow depth to Seasonal High Water Table (SHWT) and limited Right-of-Way (ROW) in which to locate required BMPs. With relatively high annual rainfall and with large percentages of the state either close to sea level and/or underlain by aquifers, bedrock, or dense soils, the chance of encountering a high groundwater table at a roadway project site is common. A high water table makes it very difficult to utilize BMPs that rely on runoff infiltration. Most BMPs require relative large areas of land to be effective, which creates particularly acute planning and design problems for projects with limited ROW. Lack of adequate soil permeability in many areas of the state creates additional BMP selection difficulties, along with areas of soil contamination.

Other problems identified in the questionnaires include limited space in urbanized areas, lack of adequate BMP maintenance, a need for multiple BMPs in areas that discharge to C1 waters, and potential safety hazards with BMPs in highway clear zones.



Part of Process Flow for Stormwater BMP Selection

An electronic decision-making program was developed using Microsoft Excel. Excel was selected since it is widely available to most users. The electronic decision-making program was tested on selected roadway projects that had already been completed. The final result is an easy to use computer program that will help planners, engineers, and managers comply with the NJDEP Stormwater Management Rules at roadway and other linear transportation projects. Finally, since the Rules are expected to change over time, the program was written to easily incorporate these changes.

CONCLUSIONS AND RECOMMENDATIONS

Rutgers University, Gannett Fleming, and Stormwater Management have provided an electronic decision making process that should be of great benefit to New Jersey engineers in designing lineal roadway systems.

This SWD process should greatly aid the NJDOT in its efforts to comply with NJDEP stormwater regulations, which are applicable to NJDOT projects. The sophistication of this product will have to be increased in the future after it is utilized by designers and engineers, and NJDEP has provided more input to the process based on field experience.

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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, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an email to Research.Bureau@dot.state.nj.us and ask for:

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