Executive Summary

This report summarizes the findings from the scan "Successful Approaches for the Use of Hydrodemolition For Partial Depth Removal of Bridge Decks." The purpose of the scan was to investigate and exchange information with users of hydrodemolition to document their specific applications. The team examined case studies of bridges undergoing hydrodemolition as well as bridges that have undergone past hydrodemolition deck replacements to examine both the process and long-term performance of bridges that have been subject to a partial deck replacement involving hydrodemolition. The team explored various aspects of the hydrodemolition process, gathering perspectives of agencies, contractors, and consultants experienced in hydrodemolition.

A scan team consisting of representatives from state DOTs, the Federal Highway Administration (FHWA), and the American Association of State Highway and Transportation Officials (AASHTO) was formed to guide the scan and develop findings, recommendations, and implementation actions. Cheryl Hersh Simmons, Chief Structural Engineer, Utah DOT, chaired the scan team.

This scan team met with users of hydrodemolition and documented their specific applications. The team examined not only bridges recently undergoing hydrodemolition but also bridges that have undergone past hydrodemolition deck replacements to study both the hydrodemolition process and long-term performance of bridges that have been subject to a partial deck replacement. The team explored various aspects of the hydrodemolition process, gathering perspectives of agencies and contractors experienced in hydrodemolition. The team specifically focused on how DOTs determined applicable candidates for hydrodemolition, specified construction requirements, and evaluated performance.

The topics were organized into the following thematic areas:

- Decision matrix that leads to the most appropriate action for the bridge deck
- Design criteria and details, construction specifications and staged-construction approaches utilized on projects specifying hydrodemolition
- Wastewater permitting, control, collection, reuse or disposal
- Special considerations regarding reinforcement steel location and protection, existing patch materials, other existing or latent field conditions or damage caused by the operation
- Limitations regarding removal depths if any
- Preferred materials for the deck itself and/or overlays to replace deteriorated concrete removed during hydrodemolition
- Relative costs for design, construction, maintenance, and inspection of bridges which have been subject to hydrodemolition
- Lessons learned and suggestions for improvement

Conversations with various DOTs reinforced the fact that hydrodemolition has been successfully

used in multiple states for many years, and multiple states have mature specifications for hydrodemolition. Of the states participating in the scan, three mentioned that there is no major obstruction to use of this method, that it is standard practice, is widely used based on cost and deck condition, and specifications are regularly updated to keep up with current practice. Two of the participating states, environmental concerns and noise issues were a common problem. The shortage of qualified contractors is a roadblock as is a lack of knowledge and training, standard practices guidance, and contract enforcement methods. Other concerns included cost of mobilization, unknown durability, benefit for life-cycle costs, limited budgets, and water availability.

Based on discussions during the scan several of the high-level conclusions regarding Hydrodemolition the team came to include:

- Hydrodemolition can be an effective tool for a bridge preservation program.

Hydrodemolition is most cost-effective when utilized in combination with mechanical removal methods for the initial surface preparation.

- Hydrodemolition should be utilized as part of a holistic deck preservation program.
- Monitoring deck condition and implementing hydrodemolition at the right time is important to achieving a deck that can achieve multiple "lives."
- Multiple states have mature deck preservation programs incorporating hydrodemolition; these should serve as starting points for other states.
- The use of hydrodemolition can be considered mature and practice-ready based on the experiences of the agencies participating in the scan, and there are existing practices for ensuring quality.

Finally, the scan team identified and is pursuing an extensive set of outreach activities to disseminate the scan's findings. These include

- Documenting presentations from states in a concise but complete report.
- Promoting and describe hydrodemolition via technical webinars.
- Make presentations to various AASHTO committees and other professional conferences to further promote the adoption and use of hydrodemolition.
- Investigate the possibility of developing Internet-based tools for gathering information from bridge owners on their experiences and practices in using hydrodemolition.
- Identify additional knowledge gaps beyond those disclosed as a part of this peer exchange, with the goal of developing National Cooperative Highway Research Program (NCHRP) research topics.
- Develop training tools to help transfer knowledge from experienced to newer employees within agencies.
- Plan and hold discussions between team members and the AASHTO Committee on Bridges and Structures about AASHTO load and resistance factor design (LRFD) specifications addressing hydrodemolition.