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15. Abstract <b>Purpose and Need</b> Due to the rising construction costs and a high demand for construction materials, the North Dakota Department of Transportation (NDDOT) has been looking for alternatives to current culvert materials. The NDDOT has not used HDPE pipe extensively in the past for this type of application. With continued improvements in material properties, high density polyethylene (HDPE) pipe may be a viable alternative for culvert applications. This experimental study will be used to evaluate the installation and monitor the performance of HDPE pipe for approach and centerline drainage.  <b>Objective</b> The objective of this research is to determine if HDPE has the structural capacity and durability to perform as an alternative to corrugated steel pipe (CSP) and reinforced concrete pipe (RCP) for culvert applications. This research will also evaluate the proposed installation detail for HDPE pipe.  <b>Scope</b> For the evaluation of HDPE, four centerline pipes and four approach pipes are specified as HDPE pipe for project AC-HPP-NH-5-012(031)054, to be constructed in 2007. The installation of the eight HDPE pipes will be monitored, and the performance of the pipe will be evaluated and documented. Deflection testing will be performed by the contractor on the installed HDPE pipe as required in the NDDOT Standard Specifications.  <b>Summary</b> The four 18" HDPE approach pipes were not installed in accordance with standard drawing D-714-14. Native material was used as backfill material instead of aggregate. After construction, in the fall of 2007, three of the four 18" HDPE approach pipes passed the 5% (17.1") mandrel test. The 18" approach pipe at location 1 did not pass the 5% mandrel test after construction. This pipe was reinstalled using D-714-14 standard drawing. The other approach pipes were left in place. All four of the centerline pipes were installed according to plan specifications with granular material used as backfill. Mandrel testing, performed to determine if the HDPE pipes were deflecting, was performed several times. The HDPE pipes were tested for construction acceptance on 10/20/07 and for evaluation reasons on 7/23/08, 08/31/09, 09/29/10, 10/05/11 and 9/20/2012. Mandrel testing was conducted to determine if the pipe was deflecting greater than 5% at any point within each pipe. The results from the latest HDPE mandrel testing were: The 5% mandrel could pass through one of the 18" approach pipes, both centerline 24" pipes, and one of the 30" pipes. The 7.5% mandrel was able to pass through all the pipes except at two 18" approach pipes at locations 2 and 8. It was found from this five year study that proper installation of the HDPE pipe with granular backfill is critical to maintain the pipe's circular shape. Depressions in the pavement surface that coincided with pipe locations appear to be related to settlement in the embankment material around the pipes. Construction of this project was completed prior to the NDDOT's implementation of control compaction of the aggregate envelope around centerline pipe. Also, the condition of the end sections of the HDPE pipe were not negatively impacted by normal ditch and inslope maintenance activities.			
16. Key Words  HDPE Pipe Culverts High Density Polyethylene Pipe	17. Distribution Statement No restrictions. This document is available in PDF <a href="#">by clicking this Link:</a>  North Dakota Department of Transportation Materials and Research Division: 300 Airport Road Bismarck ND 58504-6005 Office: (701) 328-6900 Fax: (701) 328-0310		18. No. of Pages 29  19. File type pdf