

CHAPTER IV.

CONCLUSIONS

4.1 Conclusions

In terms of watertightness, low temperature environments appear to be most detrimental to system integrity in both the existing and proposed paving systems. In general, each membrane appeared to perform equally well with the different wood preservative treatments used in the existing paving system. The only significant exception to the previous statement was the very low impedance measurements observed for the combination of creosote treated wood with Petrotac membrane after low temperature exposure cycling. Each membrane performed equally well for the proposed paving system configuration.

Bond strength between asphalt and wood with no membrane was observed to be nonexistent whether or not any preservative treatment was present. Placing a membrane between untreated wood and asphalt did result in a significant increase in bond strength, but this gain in strength was lost when preservative treatments were present in the wood substrate. In addition, bond failure typically occurred below the membrane when preservative treatments were present in the wood. Protectowrap M400A membrane performed slightly better than the other membranes when used with untreated wood, but all of the membranes performed equally when preservative treatments were present. The highest bond strengths observed in this research occurred when asphalt concrete surface material was placed directly on top of asphalt concrete base material. The addition of a membrane between these asphalt lifts reduced bond strength. The results of bond testing indicate that the proposed system will perform better in terms of shoving in the pavement overlay.

Based on the bond test results of the cores taken from the Creekside Drive bridge, it appears that a shear strength greater than 25 psi after 200 low temperature exposure cycles will provide acceptable paving system performance in a low temperature environment. For environments with twenty freeze-thaw cycles or less per season, this system should perform well for at least ten years.