"deep" pump station and "deep" lines to the cost of constructing two "shallow" pump stations and "shallow" lines. The analysis showed that a single 12" line (laid at the minimum slope of 0.22 feet per 100 feet) can be extended approximately 5,450 feet from a "deep" pump station if the line starts at a depth of 16 feet at the pump station and ends at a depth of 4 feet at the end of the line. The same area can be served using 8-inch or 10-inch lines (laid at minimum slopes of 0.40 feet per 100 feet, and 0.28 feet per 100 feet, respectively) coupled with the construction of two "shallow" pump stations. The cost data from the 1992 report showed that, when both capital costs and operation and maintenance (O&M) costs are considered, it is less expensive to serve an area with a single "deep" pump station and 12-inch sewer line (laid at minimum slope) than it is to construct two "shallow" pump stations and 8-inch, or 10-inch lines (laid at minimum slope).

Because the Woodland sewer system serves a flat area, the City incurs operation and maintenance costs that many other cities do not experience. Regardless of the size of pipe (8", 10" or 12"), the City must continue to flush the existing and proposed lines in order to insure solids are carried through the system to the treatment plant.

Due to the cost savings involved in constructing a single pump station and because the flat terrain served by the City's sewer system requires the use of pump stations and periodic flushing of the lines, this report recommends that deeper pump stations and lines be constructed to serve future sewer extensions. This will allow interceptors to be extended with a minimum of pump stations. This does not mean that 12-inch lines will be used in all cases. Eight and ten-inch diameter lines will be used where a service area can be served by a single pump station and smaller, shallower lines.

This concept will undoubtedly meet some opposition from the persons who first propose to serve one of the future proposed areas with sewers. The deeper pump station and the first 1,000-1,800 feet of 12" line will have a capital cost that is considerably more than a shallower pump station and say an 8" line. The City of Woodland should develop a cost sharing policy that allows some of the initial costs to be passed on to others who use the system later.

SEWER EXTENSION COST ESTIMATES

Figure VI-2 shows basic additions and extensions recommended for the City to implement in order to extend sewer service to the existing Urban Growth Area boundary. Cost estimates for construction of the major sewer interceptors and pump stations are included in Appendix H of this report. A summary of the costs for implementing the extensions shown in Figure VI-2 are shown in Table VI-2.

Table VI-2. Cost Estimates for Proposed Sewer Line Extensions.

Extension Area	Anticipated Capital Cost	Anticipated O&M Cost
Guild/Robinson Rd. Area	$1,523,000	$37,000
N. Pekin Rd. Area	$1,177,000	$34,000
Goerig Rd. Area	$2,066,000	$47,000
Horse Shoe Lake Area	$1,685,000	$42,000
East Woodland Area	$397,000	$24,000
Bozarth/Heights Rd. Area	$646,000	$11,000
Total	***$7,494,000***	***$195,000***

DISCUSSION OF PROPOSED SEWER EXTENSIONS

Construction of the proposed extensions will occur over time as future developments evolve. The information contained in this report should be used as a guide to help insure that sewer extensions occurring in the next few years will be constructed to allow for future development of an entire area at the least cost to the City. When development is proposed, more specific information will be gathered. That information should then be used to re-evaluate how the near term construction will fit into the long range planning for a particular area. Specific site locations for pump stations and the alignments for interceptors will depend on many factors that cannot be determined at this time. These factors include how the land owners propose to develop their land, where future roads will be located, where and what other utilities are to be installed, the density of the development, etc.