TABLES

Table ES-1	Customer Meters - Cost Effective Comparison	ES-5
Table ES-2	Distribution System – Water Main Improvements - Cost Effective Comparison	ES-5
Table ES-3	Distribution System – Looping - Cost Effective Comparison	ES-6
Table ES-4	High Service Pumps - Cost Effective Comparison	ES-6
Table ES-5	Storage - Cost Effective Comparison	ES-7
Table ES-6	Fire Flow - Cost Effective Comparison	ES-8
Table ES-7	Estimate of Project Cost	ES-10
Table ES-8	Proposed Schedule for Utility System Improvements Project	ES-11
Table ES-9	Project Funding Scenarios	ES-12
Table ES-10	New Annual Estimated O&M Cost	ES-13
Table ES-11	New Annual Short-Lived Assets Cost	ES-13
Table 1-1	Project Location	1-1
Table 1-2	SHAARD List	1-6
Table 1-3	Historical Dearborn County and Hidden Valley Lake Population Data	1-30
Table 1-4	Town of Hidden Valley Lake Population Projection to the Year 2043	1-32
Table 2-1	Water Production	2-7
Table 2-2	Water Users	2-9
Table 2-3	Current Schedule of Rates and Charges	2-9
Table 2-4	Annual Operations and Maintenance Expenses	2-10
Table 2-5	Current Monthly Water Service Summary	2-10
Table 2-6	Existing Short-Lived Assets	2-11
Table 3-1	Projected Increase in Demand for Design Year 2044 (Full Build-out)	3-6
Table 3-2	Projected Increase in Demand for Design Year 2044 (Partial Build-out) .	3-6
Table 3-3	Modeling System Pressures (psi)	3-11
Table 3-4	VRUC – Fire Flow Modeling Results	3-17
Table 4-1	Estimate of Probable Construction Cost	4-1
Table 4-2	Estimate of Probable Construction Cost	4-7
Table 4-3	Estimate of Probable Construction Cost	4-8
Table 4-4	Estimate of Probable Construction Cost	4-10
Table 4-5	Estimate of Probable Construction Cost	4-11

Estimate of Probable Construction Cost4	-15
Customer Meters - Cost Effective Comparison	.5-2
Water Main Improvements - Cost Effective Comparison	.5-3
Looping Improvements Cost Effective Comparison	.5-4
High Service Pump Improvements - Cost Effective Comparison	.5-5
Storage Tank Improvements - Cost Effective Analysis	.5-6
Fire Flow Improvements - Cost Effective Analysis	.5-7
Proposed Schedule for Water System Improvements Project	.6-1
Estimate of Recommended Project Cost	.6-2
Annual Operating Budget (2022)	.6-4
New Annual O&M Costs	.6-5
New Annual Short-Lived Assets Cost	.6-5
Project Funding Scenarios	.6-6
	Estimate of Probable Construction Cost

Figure ES-1	Existing FacilitiesES-2
Figure ES-2	Recommended ProjectES-9
Figure 1-1	General Location Map1-2
Figure 1-2	Planning Area1-3
Figure 1-3	Topographic Map1-4
Figure 1-4	Land Use Map1-5
Figure 1-5	SHAARD Map1-7
Figure 1-6	Wetlands Map1-9
Figure 1-7	Surface Waters Map1-10
Figure 1-8A	Depth to Water Table Map1-11
Figure 1-8B	Depth to Water Table Legend1-12
Figure 1-8C	Depth to Water Table Index1-13
Figure 1-8D	Depth to Water Table Index1-14
Figure 1-9	Floodplain Map1-16
Figure 1-10A	Hydric Soils Map1-17
Figure 1-10B	Hydric Soils Legend
Figure 1-10C	Hydric Soils Index1-19
Figure 1-10D	Hydric Soils Index
Figure 1-11A	Farmland Classification Map1-22
Figure 1-11B	Farmland Classification Legend1-23
Figure 1-11C	Farmland Classification Legend1-24
Figure 1-11D	Farmland Classification Legend1-25
Figure 1-11E	Farmland Classification Table1-26
Figure 1-11F	Farmland Classification Table1-27
Figure 1-11G	Farmland Classification Table1-28
Figure 2-1	Existing Distribution System2-2
Figure 2-2	High Service Pumps2-4
Figure 2-3	Stateline Storage Tank2-5
Figure 2-4	Valley Woods Storage Tank2-5
Figure 3-1	Existing System Pressures with Pumps On at Existing Peak Demand

FIGURES

Figure 3-2	Existing System Pressures with Pumps Off at Existing Peak Demand3-13
Figure 3-3	Existing System Pressures with Pumps On at Partial Build-out Peak Demand
Figure 3-4	Existing System Pressures with Pumps Off at Partial Build-out Peak Demand
Figure 4-1	Alternative 4.2.B (Replace All Lines at End of Remaining Useful Life)4-4
Figure 4-2	Alternative 4.2.C (Replace All Lines Less Than 4" Dia)4-5
Figure 4-3	Alternative 4.2.C Replace Areas of Concern4-6
Figure 4-4	Alternative 4.3.B Redundant Feed Line on South Side of Lake4-9
Figure 4-5	Alternative 4.5.C New Storage Tank with Three (3) New Booster Stations4-12
Figure 4-6	Alternative 4.5.D Construct a New Storage Tank with a Dedicated Feed Line4-13
Figure 6-1	Recommended Project

APPENDICES

- Appendix A Tank Inspections
- Appendix B User Profile
- Appendix C Asset Tables
- Appendix D Water Loss Audit
- Appendix E Electrical
- Appendix F MROs
- Appendix G Detailed Cost Estimates
- Appendix H SRF Documents
- Appendix I Public Participation
- Appendix J USFWS Information for Planning and Consultation (IPaC)
- Appendix K NRCS Documents
- Appendix L Modeling Results

Executive Summary

Commonwealth Engineers, Inc. (Commonwealth) has prepared this Preliminary Engineering Report (PER) to evaluate the present conditions and future needs for the Valley Rural Utility Company's (Valley Rural) Water Utility. This PER reviews the existing conditions, the need for improvements, and discusses alternatives for improving the Utility's facilities to provide final recommendations and a course of action to help the Utility ensure the quality and reliability of the water system throughout the planning period.

ES.1 Project Planning

The Planning Area for this study is roughly equivalent to the census boundaries for Hidden Valley. Improvements recommended directly benefit the water quality for the current water utility customers. Valley Rural's water utility serves mostly residential customers. This PER is targeted at ensuring Valley Rural has adequate high-quality water both now and over the 20-year planning period.

ES.2 Existing Facilities

The Valley Rural Utility Company owns and operates a distribution system and two (2) ground storage tanks. Treated water is purchased from the nearby City of Greendale. The distribution system serves the Community of Hidden Valley as well as some properties just outside the community limits. The Existing Facilities and planning area are shown on **Figure ES-1**.

The Utility does not produce or treat their water supply. Currently, the Utility purchases water from the nearby City of Greendale. Previously, they have also purchased water from Tri-Township Water Corporation, and the connection is still in place should the Utility choose to purchase from them again in the future and as a redundant supply. The Utility's feed point for the Greendale connection is at the southern side of the community near the Valley Woods Tank. The Tri-Township connection is at the north end of the community near the Stateline Tank.

The Utility utilizes two (2) ground storage tanks: a 500,000-gallon tank at the northern end of the community (Stateline Tank) and a 100,000-gallon tank at the southern end of the community (Valley Woods Tank).

The Utility has two (2) high service pumps located at the Valley Woods Tank. The pumping facility includes two pumps as well as housing and associated piping and valves.

The distribution system consists primarily of 2-inch to 8-inch water mains of varying materials, primarily Schedule 80 PVC, Schedule 40 PVC (primarily on 2-inch water mains), with newer lines being replaced with C900 or SDR-21 PVC. The Utility does not currently provide fire flow due to the size of many of the water lines.

