EXECUTIVE SUMMARY

DBM #I summarizes the design criteria, modelling methodology, pipe size and layout results and recommendations from the system hydraulic design stage. Design concepts established herein shall be used for the detailed design of the wastewater collection system.

The design parameters in the MPE 2015 Preliminary Design report were generally adopted, with some refinements. The hydraulic system design is based on SSWC adopting the Septic Tank Effluent Pumping (STEP) system as the on-lot pressurization system for the project. It is possible that a grinder pump system may be deemed more suitable during detailed design for a few communities due to specific site circumstances (e.g. VPL commercial establishments), but these will be exceptions and only considered where it does not compromise the integrity, operation or hydraulic design of the STEP Collection System.

The STEP pump used for this analysis is a high head semi-positive displacement effluent pump capable of 0.63 L/s (10 gpm). The minimum storage criteria for peak flow conditions was identified as 540 L. Hydraulic modelling was approached in a two-step process using Bentley's SewerCAD modelling software:

- Step 1 (Design Flow Analysis): included running the model for the design flows, which were established using the Rational Method (as per the MPE, 2015 report), to finalize pipe sizes and routing alternatives.
- Step 2 (Sensitivity Analysis): included running scenarios to evaluate system performance under low and various peak flow conditions to account for low and high use periods associated with Summer Villages.

The worst case scenario (peak summer weekends) run in the sensitivity analysis assumed 25% of all pumps running simultaneously, which is approximately 3-4 times the Rational Method design flow.

The following are conclusions derived from this report:

- Adopt the pipe sizes and routing presented in Figures 1, 2 and 3 as the basis for detailed design.
- On-lot tank systems require emergency storage for peak flow conditions as well as for system repairs, or power outages. The emergency tank storage should follow the standard STEP system

design criteria wherever possible, which is 1590 L (350 igal) of total storage [680 L peak flow storage and 910 L of system emergency storage]. In retrofit cases where existing holding tanks are used, the minimum emergency storage required is 1260 L (~ 280 igal) [540 L peak flow storage and 720 L system emergency storage]. This will be described further in DBM #3.

- Flow restrictors are required for all the lots.
- Air-vacuum valves should be installed at high points in the systems. Locations should consider the potential for negative pressure conditions for some flow scenarios in Section C.
- Cleanouts should be installed along the collection systems since velocities will be low during off-use periods.
- Emergency bypass locations were identified in some locations to accommodate a reduced flow (50% design flow). These bypasses will have normally closed valves that will only be opened in an emergency repair or maintenance situation, which will include resident notices instructing restricted water use.
- The following emergency bypass locations have been identified:
  - Ma-Me-O Beach at 3rd or 4th Street.
  - Connection between Norris Beach and the main on RR 11, downstream of Crystal Springs.
  - Connection between Grandview and Crystal Springs.
- The modelling identified the following potential locations for additional capacity.

Model Section	Additional Capacity in EDUs	Location
A: Ma-Me-O Beach	No additional capacity	
B: Crystal Springs	21	West end of Crystal Springs
C: West Alignment	30	West end at Birch Creek
	70	Middle of Poplar Bay Between Range Road 14 and 15
C: East Alignment	20	East end. Grandview
	75	Range Road 13 Area