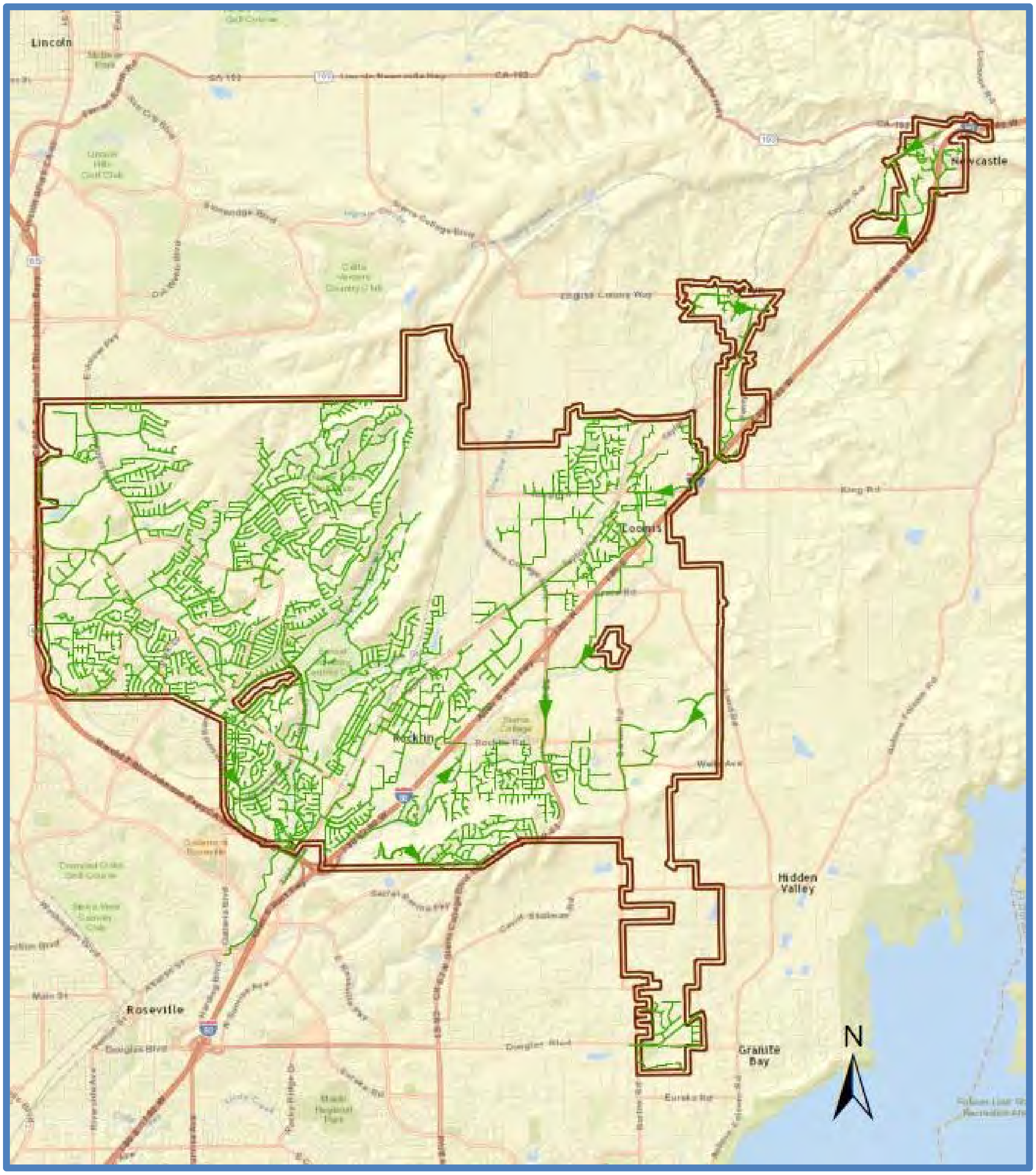
SOUTH PLACER MUNICIPAL UTILITY DISTRICT

WATERWORKS ENGINEERS

SOUTH PLACER MUNICIPAL UTILITY DISTRICT
System Evaluation and Capacity Assurance Plan



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CHAPTER 1: Introduction

1.1 Purpose

The purpose of the South Placer Municipal Utility District (SPMUD or District) Wastewater Collection System Evaluation and Capacity Assurance Plan (SECAP) is to provide the District guidance in its efforts to assure capacity for existing customers and information on how to prepare and plan for future development. This document summarizes the District's compliance with provision *D.13.viii – System Evaluation and Capacity Assurance Plan* of the California State Water Resources Control Board (SWRCB) Order No. 2006-0003-DWQ, the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (SSS WDR). It is included by reference to the District's Sewer System Management Plan (SSMP); is reviewed annually; and is updated as deemed necessary by District staff (at minimum every five years) to account for conditions affecting collection system capacity. The evaluation summarized herein utilized previous District master planning efforts as its foundation, but the results stand alone as the District's current SECAP and 5-year planning document related to capacity.

Previous master planning efforts (2009) recommended and prioritized the collection of additional flow monitoring data to refine and confirm the results of the hydraulic model simulations. The District complied with this recommendation and collected additional flow monitoring and rainfall data with permanent flow-monitoring sites. That data was used in the modeling efforts of this SECAP to revisit and refine the results and recommendations for existing and future improvements. This SECAP serves as a replacement to the master plan prepared for the District in 2009.

The specific objectives of this SECAP include:

- Comply with requirements of the California State Water Resources Control Board Order No. 2006-0003-DWQ, the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (SSS WDR) and the District's SSMP to evaluate hydraulic deficiencies, establish and implement design criteria (i.e., design storm), establish short-term and long-term capital improvement projects to address system deficiencies, and develop a schedule of completion dates for the planned capital improvements projects.
- Evaluate the capacity of the collection system under various scenarios (i.e., existing dry weather, existing wet weather, near-term wet weather, and long-term wet weather conditions) to identify capacity deficiencies and assign capital improvements projects for each scenario.
- Utilize the results of this SECAP to identify, quantify and prioritize the recommended capital improvements and the associated impacts on participation charges.

This SECAP provides the District with updated information on the existing and future hydraulic capacity of the collection system and serves as a replacement of previous master planning efforts. However, it should be noted that the foundation of this SECAP includes some reference to those previous evaluations and as such the District reserves the right to reference that data for clarity as deemed necessary by staff. The following chapters of the SECAP describe the assumptions used; the process of model development; the model simulation results; and the proposed capital improvement projects, costs and priority.

CHAPTER 2: Project Overview

2.1 Project Boundary

South Placer Municipal Utility District serves the communities of Rocklin, Loomis, Penryn, Newcastle, and portions of Granite Bay and unincorporated Placer County. The District owns, operates, and maintains a collection system, which consists of approximately 250 miles of mainline pipe (ranging from 4-inch to 42-inches in diameter), over 5000 manholes, thirteen lift stations, and ten permanent flow monitoring stations. Figure 1 in Appendix A shows a map of the District service area as well as the area evaluated with the hydraulic model as part of the SECAP. The SECAP area coincides with the study area identified in the South Placer Municipal Utility District Wastewater Collection System Master Plan (2009) and the District's urban growth area (UGA) identified in the South Placer Regional Wastewater and Recycled Water Systems Evaluation Updated Final Report (2009), which evaluated the combined systems of the regional partners discharging to the two regional wastewater treatment plants. It is important to note that the areas evaluated are the same, since one of the objectives of the SECAP is to build off of those previous planning studies to maintain consistency of analysis but replace the results with updated model simulation results.

Figure 1 also shows the areas that were not included in the SECAP and thus were not evaluated with the hydraulic model. The Rodgersdale community was not included in the hydraulic model for the same reasons it was not evaluated in the 2009 master plan (i.e., the entire community is built out with no room for future development and according to District records, there are no existing capacity related issues). Additionally, the District sphere of influence (SOI), which represents the full extent of the District's potential service range, was not included in the hydraulic model. This is consistent with the foundational assumptions related to growth potential made in the previous hydraulic evaluations (i.e. the extension of the collection system into this area is not likely based on current planning projections, even under long-term scenarios.)

2.2 Hydraulic Modeling Software

The capacity of the District wastewater collection system was analyzed using Innovyze's InfoSewer software program. InfoSewer is an ArcGIS-based computer program with extensive hydraulic computational capabilities. The District purchased the InfoSewer software and license so that future analyses could be conducted by District staff as additional data is collected and additional inquiries arise due to future development. The InfoSewer product provided scenario management so that multiple scenarios (i.e., existing, near-term, long-term, dry weather, wet-weather, various improvements) can be tracked and compared, one against the other.

2.3 Flow Monitoring

As mentioned previously in the SECAP, the District complied with the recommendation of the 2009 master plan to collect additional flow monitoring data to refine the results of the 2009 model simulations. Additional permanent flow monitors were installed in the collection system to collect this data. The ten permanent flow monitors in the system collect and store data in fifteen-minute intervals. The additional permanent flow monitors were brought online in 2010, and by 2011, consistent flow monitoring data was being collected from these sites. Flow records from the entire year of 2011 were used in the SECAP to calibrate the volume of flow entering each basin within the system.

2.4 Design Storm

In addition to the permanent flow monitors described above, the District has installed and currently maintains rain gauges throughout the system. The rain gauges collect data regarding the amount of precipitation in fifteen-minute intervals on a continuous basis. Rainfall data from the entire year of 2011 was used in the SECAP to define the rate of inflow and infiltration into the collection system from a storm event.

The 10-year, 6-hour storm event was established as the “design storm” for the District during the development of the 2009 master plan, and it remains an applicable capacity assurance evaluation criteria for engineering analysis and is an industry accepted value. The same “design storm” was used in this SECAP.

The design storm for the study’s model simulations was developed using the EPA's Sanitary Sewer Overflow Analysis and Planning (SSOAP) Toolbox. The SSOAP Toolbox is a suite of computer software tools that allows one to utilize collected data for both sewer flows and rainfall to predict rainfall-dependent inflow and infiltration (RDI/I). RDI/I was defined by using the RTK method to generate synthetic unit hydrographs for each basin within the collection system. The unit hydrographs are used to develop the design storm hydrographs. A 10-yr, 6-hr storm did not occur during the monitoring period of 2011, so the observed data was used to identify the parameters that define the unit hydrograph for each basin. The 10-yr, 6-hr storm event for the Rocklin area as defined by the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 6, Version 2 data was applied to the synthetic unit hydrographs to produce the RDI/I hydrographs for each basin.

Since a 10-yr, 6-hr storm was not observed during the monitoring period, the wet weather flows could not be calibrated at this time. This is not atypical in modeling efforts, but using the method described above increases the probability that the modeled flows represent the flows in the system during the design storm. The District continues to collect flow monitoring data from its permanent flow meters, as well as targeted portable temporary metering efforts where deemed appropriate by District staff. This data will be utilized as part of future updates to the SECAP to continue to refine and calibrate the wet weather model results.

2.5 Scenario Development

One of the study’s objectives was to investigate the collection system’s capacity under varying conditions, and to propose potential improvements to address capacity-related deficiencies. To meet this objective, the study examined the hydraulic capacity of the system under four conditions.

1. Existing;
2. Near-term development;
3. Long-term development lower bound; and
4. Long-term development (ultimate build-out) conditions.

The model also investigated the impact of rain events (i.e., RDI/I) by simulating each temporal variation in the model (i.e., existing, near-term, long-term) under dry weather conditions and during the design storm event described in section 2.4. Table 1 provides the naming convention of the various scenarios used in the model and a description of what is included in each scenario.

Table 1. Summary of Model Scenarios

Scenario	Dry	Wet	CIP	Description
Existing	1A	1B	1CIP	Current collection system infrastructure (including Newcastle and Upper Antelope East Trunk Sewer). Current EDUs as defined in District records.
Near-Term	2A	2B	2CIP	Collection system after required improvements to existing system and proposed mitigation (Sierra College Lift Station and Boyington Diversion). Addition of EDUs from near-term development as defined in city/town/community general plans.
Long-Term (Lower Bound)	5A	5B	5CIP	Collection system after required improvements for near-term development. Addition of EDUs from undeveloped parcels, developed parcels currently on septic within the UGA, and no densification of those parcels.
Long-Term (Upper Bound)	3A	3B	3CIP	Collection system after required improvements for near-term development. Addition of EDUs from parcels within the UGA, assuming maximum allowable densification.

For the purposes of District UBO planning efforts, the Long-Term Lower Bound scenario best represents the current potential for growth within the UGA. As part of the District's periodic SECAP updates, this assumption will be evaluated and modifications made as necessary to match growth planning data available at such time.

2.6 Capacity Analysis

For purposes of the SECAP, capacity-deficient pipes are defined as those having less than three feet of freeboard (i.e., three feet from the hydraulic grade line to the rim elevation of the manhole). A freeboard of zero feet indicates that a sanitary sewer overflow occurs. Once a pipe segment begins to surcharge, the addition of even small amounts of flow can make dramatic changes to the level of surcharging in manholes. However, surcharging in manholes typically only occurs for short durations, during design storm events (i.e., 10-year, 6-hour rainfalls). This criterion is used so that small amounts of surcharging is allowable during the design storm scenario.

CHAPTER 3: Model Development

Model development is generally separated into two main phases. The first phase involves defining the physical attributes (i.e., pipe and manhole diameters, lengths, roughness coefficients, invert elevations, rim elevations) of the collection system. The second phase involves defining the amount and location of flows entering the system. This chapter describes the process employed to develop the model simulations used for this SECAP.

Model results were obtained using extended period simulations over a three day (72-hour) period. This method was selected so that the variation in flow and the impact on the system's capacity could be assessed during the design storm event and in the days that follow.

3.1 Physical Geometry

The hydraulic model represents the actual collection system with a combination of features which include pipe, manholes, wet wells, pumps, and force mains. The location and attribute information for these model features was supplied by the District in the form of GIS files, both from the District's master GIS database and files used in the 2009 master plan. This information was used to create the modeled collection to which flows would be applied to assess the system's capacity.

Proposed future pipe segments were added to the model under near-term and long-term scenarios to assess the capacity of those segments to serve future connections. Where upsizing of existing facilities was needed then a matching or similar alignment was proposed. However, for potential growth areas where there is limited or no existing infrastructure, the GIS tools available through the ArcGIS extension "3D Analyst" were employed to investigate the topography in areas to determine if parcels could be served by gravity and where appropriate future trunk pipelines (size and rough alignment) were added to the model. It should be noted that these assumptions were not based on survey-grade information, and may require alterations during final design to account for more accurate information. In addition, only potential trunk sewers were included in the model, "local sewers" will be designed and built to connect to these facilities in their final location.

3.2 Hydraulic Loading

The flows modeled in the SECAP were generated at the parcel-level and applied to the collection system. Flows were modeled in this way so that unit generation rates could be applied based on customer type, land use designations, and parcel size. This method was also selected because it provides a method for documenting assumed unit generation rates for future modeling efforts and back-checking of model simulation results. This section describes the methods used to assign flow volumes from individual units/parcels for the various scenarios.

3.2.1 Unit Generation Factors

The District applies a number of equivalent dwelling units (EDUs) to its customers as they connect to the collection system in accordance with the current District Ordinance. An EDU is a unit of measure that standardizes all land use types and represents a unit of flow (gallons per day), at a certain wastewater strength, from a single family residential unit. As an example how this could be applied to other types of land uses, a small business designed to discharge three times as much water as an average single-detached dwelling would be assigned three EDUs. The number of EDUs for each customer was supplied by the District and used to calculate flows from each parcel into the collection system. To maintain a foundational capacity evaluation criteria consistent with previous planning studies, **190 gpd/EDU** was applied as the unit generation factor throughout all model simulations.

Existing Development

The parcels connected to the existing collection system and the usage type of each parcel were identified using District records. Three main categories for usage type were applied in the model (i.e., residential, commercial, and school). Diurnal patterns were developed for each of the usage types and applied to the flows generated from each parcel.

Model results from the existing dry weather simulation were used to compare against the recorded flow monitoring data to calibrate the model. This is a crucial step to assure that the model results accurately reflect the amount of flow observed in the system. The assumed flowrate per EDU used in the model matched well with the dry weather flows recorded by the flow monitors.

Near-Term Development

Parcels that are anticipated to be developed in the near-term were identified and assigned EDUs. The basis for identifying Near-Term Developments was the foundational research developed and presented in the 2009 master plan. The following sources for future land use were identified in the 2009 master plan and these remain applicable for the SECAP.

- City of Rocklin Draft General Plan Update (Quad Knopf, Inc., March 2005)
- Town of Loomis General Plan (Crawford Multari & Clark Associates, July 2001)
- Placer County General Plan (Placer County, August 1994)
- Horseshoe Bar / Penryn Community Plan (August 1994)
- Granite Bay Community Plan (May 1989)

The rate of development since the 2009 master plan has slowed dramatically due to the economic downturn that is generally agreed to have really hit the development community in late 2008. Most of the near-term developments that were identified in the 2009 master plan where anticipated to be in service by the year 2020, yet much of this development has yet to be constructed and only recently started to have potential to move forward out of planning and into construction. For this reason, the near-term developments from the 2009 master plan were carried forward into this near-term scenarios for the SECAP (i.e. by the year 2030). The assigned near-term EDUs were used to calculate the hydraulic loading of the system for near-term scenarios.

Long-Term Development (UBO)

The long-term hydraulic loading of the model was completed by including all of the developable parcels within the Urban Growth Area (UGA). This scenario models all parcels as contributing to the collection system and thus represents the ultimate build out (UBO) of the UGA. The general plans referenced above, along with Placer County zoning information were used to determine the use and assumed hydraulic loading of long-term developments. Additionally, the general plan for downtown Rocklin identifies a densification of the area during future development. The densification resulted in an increase in the number of EDUs in the area and thus an increase in the calculated hydraulic loading to the system.

Many of the parcels designated as connecting to the collection system under the long-term (UBO) scenario are located in rural areas of the UGA. Many of the parcels currently contain residences that have individual septic systems and are located on large areas of land. Because of the lack of detailed data about potential for densification of these parcels (to a level consistent with the currently approved general planning documents) as part of future development plans, it is difficult to definitively determine the eventual loading onto the system. To investigate the potential range of flows entering the collection system under the long-term (UBO) conditions, two scenarios were developed to investigate the upper and lower bound of anticipated Long-Term hydraulic loadings.

The **Long-Term Lower Bound** assumed that parcels that currently contain residences or businesses will not develop (e.g., subdivide) in the future. Those residences/businesses will abandon their individual septic systems and connect to the District collection system when the District expands service into those areas. Currently vacant or undeveloped parcels were assumed to develop according to the Placer County zoning requirements regarding minimum parcel size to determine the future hydraulic loading. For the purposes of quantifying future improvement costs, the lower bound scenario best represents the current potential for growth within the UGA. As part of the District's periodic SECAP updates, this assumption will be evaluated and modifications made as necessary to match growth planning data available at such time.

The **Long-Term Upper Bound** assumed that all parcels not currently served by the District's collection system will subdivide and/or develop according to the Placer County zoning requirements for minimum parcel size. This scenario may be unrealistic since many parcels that currently have residences will never subdivide. However, this upper bound represents the theoretical maximum hydraulic loading on the collection system within the UGA. The results from this upper bound scenario were not used as a basis for determining future improvement costs.

The results of the Long-Term upper bound scenario were retained as a source for comparison against the lower bound results. For example, the required upsize in pipe diameter to accommodate the upper bound flow may only be one pipe size larger than the required upsize to accommodate the lower bound flow. Construction of the larger diameter pipe may add only a small amount to the project cost while providing the capacity for the ultimate potential development. The District retains the right to require the larger of the two pipe sizes be built based on growth and development data available at the time the individual projects are submitted and approved.

The total EDUs for each scenario and their associated average dry weather flow are show in Table 3.

Table 2. Summary EDUs and ADWF by Modeled Growth Scenario

Sewer Trunk	Total EDUs	Additional EDUs from Previous	Total ADWF EDU x 190GPD/EDU (MGD)
Existing (2014)	30696		5.8
Near Term (2030)	39954	9259	7.6
Long-Term, Lower Bound (2060)	49285	9331	9.4
Long-Term, Upper Bound	57620	8335	10.9

A linear regression of the District's past growth shows that the District has grown at an overall rate of 905 EDUs per year. The average rate of growth over the District's history is approximately 791 EDUs per year. Figure 1 shows the projected number of EDUs within the District over time if growth continues at these rates. However, the growth of the District over the past five years has slowed and averaged less than 400 new EDUs per year. While this slowdown in development may not be typical of future growth, it is anticipated that the rate of growth within the District will slow as the areas within the District reach build out. A number less than the historic average was selected to conservatively identify the appropriate amount for local participation charges to fund the needed capital improvements identified in the SECAP.

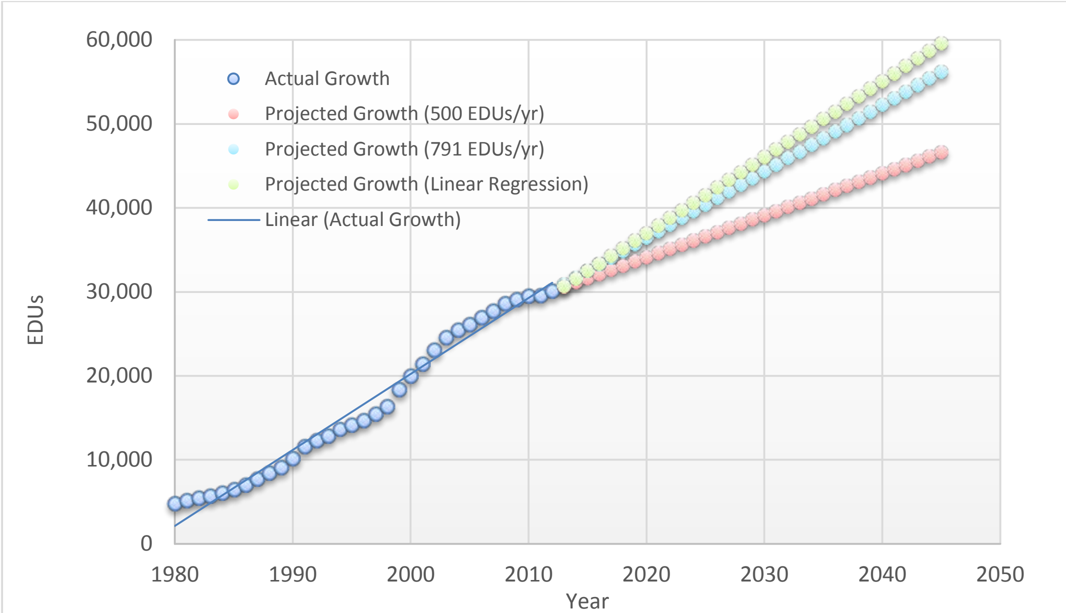

Figure 1. SPMUD Equivalent Dwelling Unit (EDU) Projections

3.2.2 Allocation of Generated Flows

The InfoSewer software applies loads to the model using the manhole features. The hydraulic loads generated at each parcel, as described in section 3.2.1, were individually allocated to specific manholes within the system. This was accomplished by assigning a connecting manhole to each parcel within the limits of the UGA. The InfoSewer Load Allocator extension automates the process of summing the hydraulic loads from various parcels and assigning the loads to the designated manholes. Additionally, the Load Allocator extension sums each type of hydraulic load (i.e., residential, commercial, school) separately, so that the appropriate diurnal curve can be applied to the matching hydraulic load type.

Assigning hydraulic loads to each parcel and assigning each parcel to a manhole in the model of the system more closely represents reality with the model simulations and thus improves the reliability of the results. Additionally, it documented the process used to develop model simulations and allows for current and future users of the modeling software to more easily examine and retrace the assumptions made to produce the model results.

3.2.3 Rainfall Dependent Inflow/Infiltration

Rainfall dependent inflow and infiltration (RDI/I) is the increased portion of water flow in a sanitary sewer system that occurs during and after a rainfall event. RDI/I can represent a significant portion of the collection system's capacity to convey wastewater. This section describes the process used during the SECAP to quantify the amount of RDI/I entering the District's collection system, and the method used to represent the level of RDI/I in the model simulations.

The data collected by the District's flow monitoring stations and rain gauge station were used to quantify the amount of RDI/I entering the system from each sewer basin. The quantity and timing of RDI/I entering the collection system in response to the design storm was developed using the EPA's Sanitary Sewer Overflow Analysis and Planning (SSOAP) Toolbox. Utilizing this method allowed the model to more accurately represent the response of each basin to the design storm based on observed data. RDI/I was applied to the existing conditions model simulations using this method.

Because historic flow monitoring data can do little to predict the response of future collection system components (e.g., pipes, manholes), a general RDI/I value was applied to future portions of the collection system modeled in the near-term and long-term scenarios. A value of 600 gpd/ac was applied to the hydraulic load from parcels connecting to the system under these future scenarios. This value is representative of the RDI/I values observed in the newer portions of the District's existing collection system after the SSOAP Toolbox analysis. Certain portions of the existing system exhibited lower values of RDI/I than 600 gpd/ac entering the system, but this number was selected as a conservative, yet realistic number to represent RDI/I entering the system from new development.

CHAPTER 4: Capacity Analysis Results

4.1 Existing Capacity

Under existing dry weather conditions, the model simulation showed that the pipes in the collection system, with a few exceptions, flow less than 50% full during the period of peak flow. Pipe segments along the Lower Loomis Trunk (Pipe M12-38 to Pipe L11-18) range between 50% full and 65% full during peak flow. Two pipe segments (H9-1 and I10-48) have slopes of 0.05% and 0.02% respectively. Due to the shallow slopes of these pipes, they have limited hydraulic capacity. No surcharging of manholes or sanitary sewer overflows occur under the existing dry weather scenario.

Figure 2 in Appendix A shows the results of the capacity assurance analysis under existing dry weather conditions. This figure also displays the modeled flow rate from the various basins within the model simulation.

Under existing wet weather conditions, the model simulation showed that pipe segments in the Loomis, Secret Ravine, Antelope Creek, and Five Star basins are more than 70% full during peak flow. The model simulation shows five SSOs under the existing wet weather scenario.

Figure 3 in Appendix A shows the results of the capacity assurance analysis under existing wet weather conditions. The figure also shows the manholes with modeled SSOs and the simulated peak flows through various segments of the collection system.

4.2 Near-Term Capacity

Under near-term wet weather conditions, the model simulation showed that three portions of the collection system exceed the allowable level of surcharging defined in this SECAP(i.e., less than three feet of freeboard). Two areas (i.e., the Clover Valley Trunk and the Foothill Trunk) experienced SSOs in the model simulation. The Lower Clover Valley Trunk had a number of manholes which surcharge to within a foot of the manhole rim elevations, exceeding the allowable level. As such, this sewer trunk was identified as capacity-deficient under the near-term scenario.

Figure 5 in Appendix A shows the results of the capacity assurance analysis under near-term wet weather conditions and identifies the capacity deficiencies described above. The figure also shows the manholes with modeled SSOs and the simulated peak flows through various segments of the collection system. Figure 5 includes proposed improvements to the system required to serve as mitigation for existing system and near-term development scenario improvements (i.e. Lower Loomis Trunk Diversion Line A&B and Boyington Diversion, which are discussed in further detail in section 5.3)

4.3 Long-Term Capacity

Two long-term wet weather scenarios were modeled as described in sections 2.5 and 3.2.1. Under the long-term lower bound wet weather scenario, the model simulation showed the trunk sewers in the Loomis and Secret Ravine basins are overwhelmed and multiple SSOs occurred in the model. These basins have a significant amount of additional area that connects to the collection system under the long-term conditions. The sewer interceptors in these basins are some of the oldest in the District and were not originally designed to convey ultimate build out flows. Conversely, the model simulation showed that the Pleasant Grove basin (i.e., west Rocklin) has no pipe segments with capacity deficiencies. A portion of the Lower Clover Valley Trunk in the Antelope Creek basin experiences SSOs in the model simulation. The remainder of the Antelope Creek basin and the Five-Star Basin did not show capacity deficiencies under this scenario.

Figure 7 in Appendix A shows the results of the capacity assurance analysis under the long-term, lower bound, wet weather conditions and identifies the capacity deficiencies described above. The figure also shows the proposed alignments of future trunk lines needed to collect and convey ultimate build out flows.

The results of the long-term, upper bound, wet weather scenario are similar to the lower bound scenario with multiple SSOs occurring in the Loomis and Secret Ravine basins and along a portion of the Lower Clover Valley Trunk. Figure 9 in Appendix A shows the results of the capacity assurance analysis under the long-term, upper bound, wet weather conditions and identifies the resulting capacity deficiencies.

CHAPTER 5: Capital Improvement Projects

The capacity analysis results were reviewed and improvements identified to address deficiencies associated with each scenario. Each scenario was then modeled again with the proposed improvements to confirm general sizing, slope and alignment required to eliminate the identified deficiencies. Capital Improvement Projects (CIPs) were established and prioritized to develop a schedule of completion for the planned capital improvements projects. The schedule for planning, design and construction of the identified improvements shall be based on the District's analysis of risk of failure, actual pace of development, and location. CIPs relieving existing system deficiencies are the highest priority improvements, while CIPs related to future development shall be addressed by the District in coordination with submitted, approved, and constructed developments. The District utilizes the results of this SECAP to identify, quantify and prioritize the recommended CIPs and the associated impacts on services charges to existing customers to rectify existing capacity deficiencies and participation charges to build capacity to serve future developments. This Chapter summarizes the CIP costs and prioritization.

5.1 Project Cost Assumptions

The identified CIPs are consistent with much of the foundational sizing, slope and alignment that was identified in previous planning studies. For all proposed improvements, the capital cost estimates were built off of previous estimates but updated to current construction costs. As such, a value of $20 per inch/diameter-foot was used to estimate construction costs for the proposed improvements (2014 Dollars with an ENR 20 Cities Construction Cost Index of 9664). Additionally, a 30% planning contingency was applied to the construction costs and an additional 10% was used to account for the engineering design and administration costs. These values are consistent with percentages used to quantify costs in foundational planning work. All costs are rounded to the nearest $10,000. These planning costs are used to define the District's short-term (5-year) and long-term financial liabilities related to capacity improvements. The District intends to maintain this method of generating project costs so that the potential impact on charges levied by the District can be evaluated by comparing the periodic SECAP updates and refining services and participation charges to fund CIPs associated with existing customers and future development customers.

5.2 Existing CIPs

To address the existing wet weather capacity deficiencies described in section 4.1, a section of the existing 10-inch diameter Lower Loomis Trunk must be upsized to 12-inches in diameter. The cost estimate for this is described below in Table 3.

Table 3. Summary of Existing System Improvements

Sewer Trunk	Existing Diameter(s)	Proposed Diameter(s)	Length (LF)	Cost ($)
Lower Loomis	10"	12"	3150	760,000
Contingency (30%)				230,000
Subtotal – Construction Costs				990,000
Design/Administration (10%)				100,000
Total Capital Costs				**1,090,000**

Figure 4 in Appendix A shows the extent of the required improvements and the result those improvements have on the capacity of the system after they have been implemented.

The improvements to the Lower Loomis Trunk would be funded by existing users since the deficiency in capacity is due solely to existing use. However, these improvements and the associated cost could be eliminated by constructing the mitigation improvements described below in section 5.3. These mitigation improvements will divert a portion of the flow through the Lower Loomis Trunk, eliminating the required improvements to the Lower Loomis Trunk. Foregoing improvements to the Lower Loomis Trunk would represent a risk to the District for SSOs and the associated potential regulatory enforcement. It should be noted that this risk is similar to that which the District has been operating along that stretch of truck sewer since 2009 and no spills have occurred along that line (due to capacity or any cause) since the implementation of the SSS-WDR. Accepting this risk would allow the District to apply the funds allotted to the Lower Loomis Trunk improvement project to the mitigation improvement projects, which would provide a more robust long-term solution and be more cost effective for existing and future customers. This SECAP and all of the foundational planning studies identified the Loomis Diversion Line as the preferred system improvement to provide capacity for the Loomis Basin service areas and SPMUD has always assumed this line would be constructed as development necessitated in these areas.

5.3 Mitigation CIPs

Growth potential in the Loomis Basin is included in near-term scenario. Some of the CIPs required to serve this growth also provide relief of the existing condition capacity deficiencies. To take advantage of the cost efficiencies associated with accelerating the construction of these projects to mitigate existing capacity deficiencies as well as provide service for the proposed development, the District has planned a number of projects to mitigate the capacity deficiencies for existing and future users in the trunk sewers through the Loomis basin. The Sierra College Lift Station was one of the mitigation projects identified in previous planning studies and was completed in 2013. Table 4 contains a list of the remaining projected mitigation projects and their associated costs. This SECAP assumed that these mitigation improvement projects would be constructed to convey flows from near-term and long-term development, in lieu of constructing the identified existing condition CIPs. The mitigation improvement projects are displayed in all of the near-term and long-term figures in Appendix A.

Table 4. Summary of Mitigation Infrastructure

Sewer Trunk	Existing Diameter(s)	Proposed Diameter(s)	Length (LF)	Cost ($)
Boyington Diversion	-	12”	3480	840,000
Lower Loomis Div. A	-	15”	4710	1,420,000
Lower Loomis Div. B	-	18”	5320	1,920,000
Contingency (30%)				1,260,000
Subtotal – Construction Costs				5,440,000
Design/Administration (10%)				550,000
Total Capital Costs				**5,990,000**

5.4 Near-Term CIPs

The improvement projects listed in Table 5 were developed to address the near-term wet weather capacity deficiencies described in section 4.2. It should be noted that the cost of the proposed Lower Clover Valley improvement accounts for the portion of the project related to the expansion of capacity. A portion of the project is anticipated to be paid for from the depreciation collected in the District’s General Fund/Rehabilitation Fund to account for the replacement due to the condition of the assets.

Table 5. Summary of Near-Term System Improvements

Sewer Trunk	Existing Diameter(s)	Proposed Diameter(s)	Length (LF)	Cost ($)
Clover Valley A	8"	15"	6250	1,880,000
Clover Valley B	10"	18"	3260	1,180,000
Foothill	12"	24"	2275	1,100,000
Lower Clover Valley	18"	24"	3115	1,500,000
Contingency (30%)				1,700,000
Subtotal – Construction Costs				7,360,000
Design/Administration (10%)				740,000
Total Capital Costs				**8,100,000**

Figure 6 in Appendix A shows the extent of the required improvements and the result those improvements have on the capacity of the system after they have been implemented. The flow from the proposed developments in the upper reaches of the Antelope Creek basin (i.e., Clover Valley Lakes and The Summit developments) would overwhelm the existing sewer trunks. Improvements to the Clover Valley and Lower Clover Valley would be necessary to support these developments. Additionally, the portion of the Foothill Trunk with minimal slopes (i.e., pipe segment I10-005 to pipe segment I10-028) would need to be replaced to provide the needed capacity for near-term development.

Appendix B contains profiles of the sewer trunks listed in Table 5 that show the hydraulic grade line during peak flow under near-term wet weather conditions, before and after the proposed improvements are implemented.

5.5 Long-Term CIPs

As described above, two scenarios were modeled to represent possible long-term conditions. One scenario represented the lower bound, long-term condition which assumes that existing residences and businesses within the UGA, not currently connected to the collection system, will connect once service is available, and undeveloped parcels will develop according to the documented general plans and current county zoning. The upper bound, long-term scenario assumes that all parcels not currently connected to the collection system will develop (e.g., subdivide) according to current county zoning. For the purposes of District UBO planning efforts, the lower bound scenario best represents the current potential for growth within the UGA. As part of the District's periodic SECAP updates, this assumption will be evaluated and modifications made as necessary to match growth planning data available at such time.

In addition, the results of both scenarios indicate the need for significant, yet similar improvements to the collection system, only the costs of the improvements to address the lower bound, long-term scenario will be considered. Table 6 contains the list of proposed improvements to provide sufficient capacity for long-term development.

Table 6. Summary of Long-Term Lower Bound System Improvements

Sewer Trunk	Existing Diameter(s)	Proposed Diameter(s)	Length (LF)	Cost ($)
Upper Antelope Creek East	8”	10”	1980	400,000
Bankhead	8"-12"	15”	9575	2,880,000
Fiberboard A	15”	18”	6260	2,260,000
Fiberboard B	18”	21”	6735	2,830,000
Lower Clover Valley A	18”	24”	3730	1,800,000
Lower Clover Valley B	24”	27”	3115	1,690,000
Lower Loomis Diversion	15"-18"	21”	11,945	5,020,000
Sierra College	15”	18”	2400	870,000
Foothill A	10”	12”	5300	1,280,000
Foothill B	15”	24”	2720	1,310,000
Lower Secret Ravine A	24”	30”	4680	2,810,000
Lower Secret Ravine B	24"-27"	36”	4000	2,880,000
Woodside A	24”	30”	1165	700,000
Woodside B	27"-30"	36”	1150	830,000
Contingency (30%)				8,270,000
Subtotal – Construction Costs				35,830,000
Design/Administration (10%)				3,590,000
Total Capital Costs				**39,420,000**

Figure 8 in Appendix A shows the extent of the required improvements to address deficiencies for the lower bound conditions of the long-term scenario and the result those improvements have on the capacity of the system after they have been implemented.

Figure 10 in Appendix A shows the extent of the required improvements to address deficiencies for the upper bound conditions of the long-term scenario and the result those improvements have on the capacity of the system after they have been implemented.

5.6 New Sewer Trunks and Associated Improvements

Proposed new sewer trunks will need to be constructed to convey flow from future development. The alignments, sizes, and lengths of new sewer trunks were based on foundational data from the District’s 2009 and 1986 master plans, which remained generally consistent with the SECAP current planning effort. In addition, as part of the District’s recently completed Loomis Diversion Route Study (2014), future trunk lines to serve potential development east of Secret Ravine tributary to the Loomis Diversion line were identified. As part of that analysis it was determined that the majority of those trunk lines will flow by gravity to the Loomis Diversion line, but to serve potential future growth east of Secret Ravine within the Brace Road sewer shed will require a pump station to lift flow into the future Loomis Diversion line. As such, these improvements were added to those identified in previous planning studies. Alignments were developed and/or reviewed and updated as generally described in 3.1. Table 7 lists the costs for these new trunk sewers and associated improvements.

Table 7. Summary of New Sewer Trunks

Sewer Trunk[1]	Proposed Diameter(s)	Length (LF)	Cost ($)
Upper Clover Valley A	8”	8130	1,310,000
Upper Clover Valley B	10”	7040	1,410,000
Upper Antelope Creek East[1]	8”	1800	290,000
Upper Antelope Creek West	8“	7850	1,260,000
Upper Antelope Creek Middle A	8“	7900	1,270,000
Upper Antelope Creek Middle B	10“	5170	1,040,000
Upper Antelope Creek	15“	15200	4,560,000
Loomis East	8“	11600	1,860,000
Brace Road East	12“	27500	6,600,000
Brace Road Pump Station			2,500,000
Croftwood East	8“	10,300	1,650,000
Contingency (30%)			7,130,000
Subtotal – Construction Costs			30,880,000
Design/Administration (10%)			3,090,000
Total Capital Costs			**33,970,000**

(1) The portion of the Upper Antelope Creek East New Trunk Sewer on Swetzer to Mareta was already constructed by the District in 2013 to eliminate the cost and risk of operating the Munoz Pump Station and as such only a small extension from that line to connect to the future Upper Antelope Creek Trunk was included.

CHAPTER 6: Appendices

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- Figure 2 – Existing ADWF – Compared to Flow Monitoring Data
- Figure 3 – Existing PWWF (10-year, 6-hour Design Storm)
- Figure 4 – Existing PWWF (10-year, 6-hour Design Storm) – with Proposed Improvements
- Figure 5 – Near-Term PWWF (10-year, 6-hour Design Storm)
- Figure 6 – Near-Term PWWF (10-year, 6-hour Design Storm) – with Proposed Improvements
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- Figure 9 – Long Term PWWF – Upper Bound within the UGA
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Appendix C – Capital Outlay Fund Financial Projection Worksheet

6.1 Appendix A – Figures

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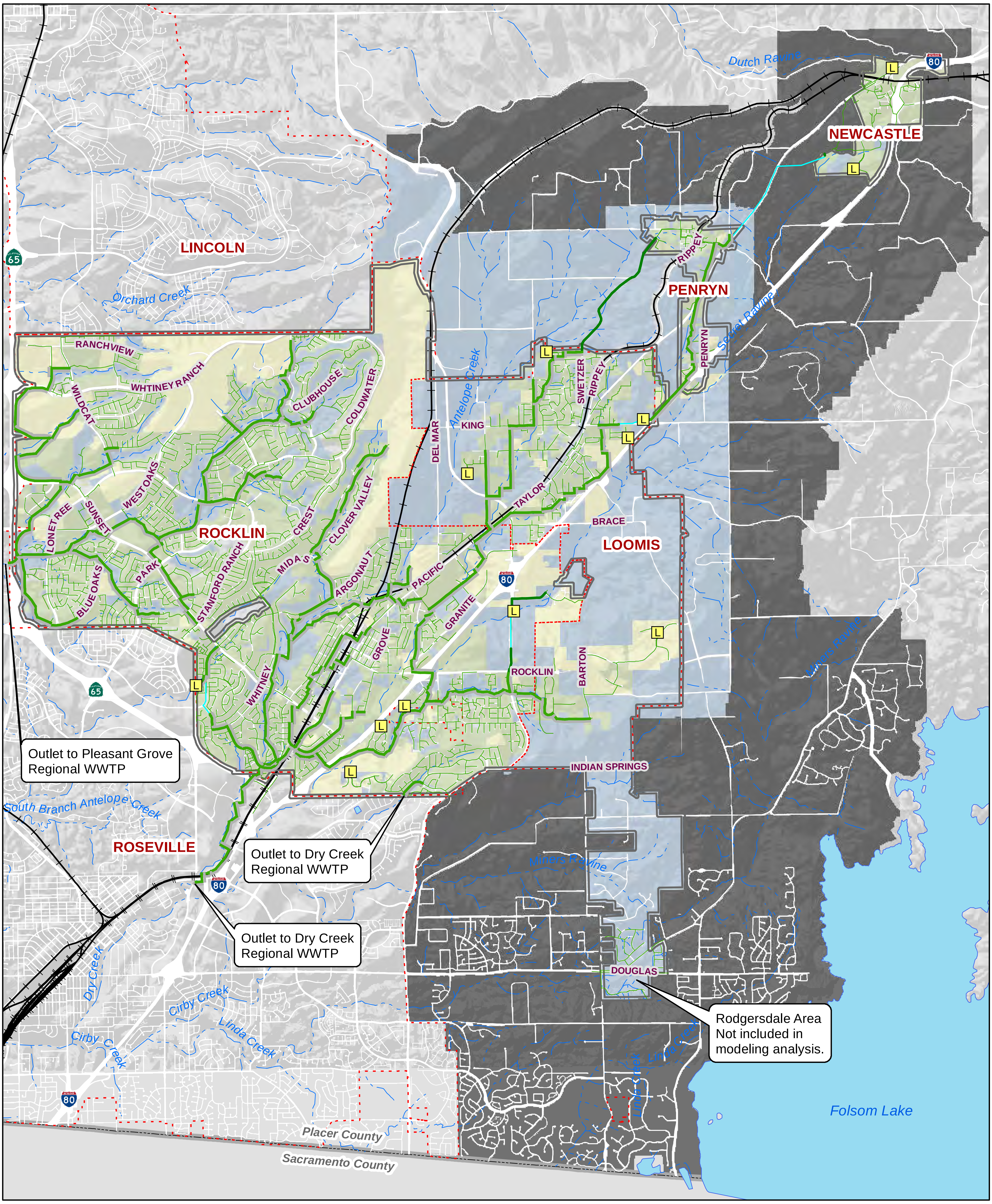


Legend

L Lift Station

Boundaries

SPMUD

City Limits

Model Scenarios

Existing (2012)

Near-Term (2020)

Long-Term

Not Modeled

Proposed SOI Ouside the UGA

South Placer Municipal Utility District
Wastewater Collection System Model

Overview

of South Placer Municipal Utility District

SPMUD SOUTH PLACER MUNICIPAL UTILITY DISTRICT

FIGURE 1

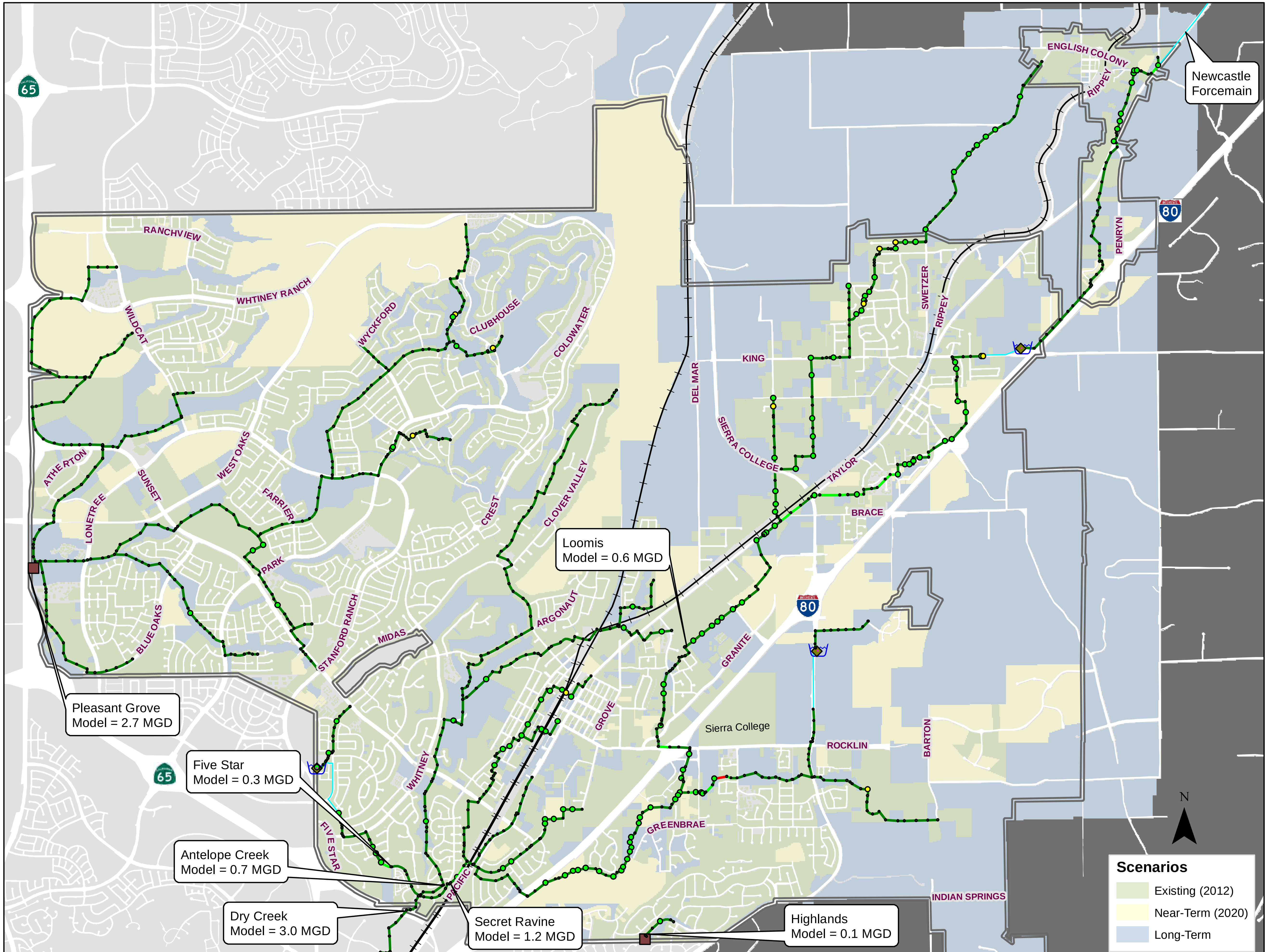


FIGURE 2

South Placer Municipal Utility District
Wastewater Collection System Model

Existing ADWF

Legend

Manhole

Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

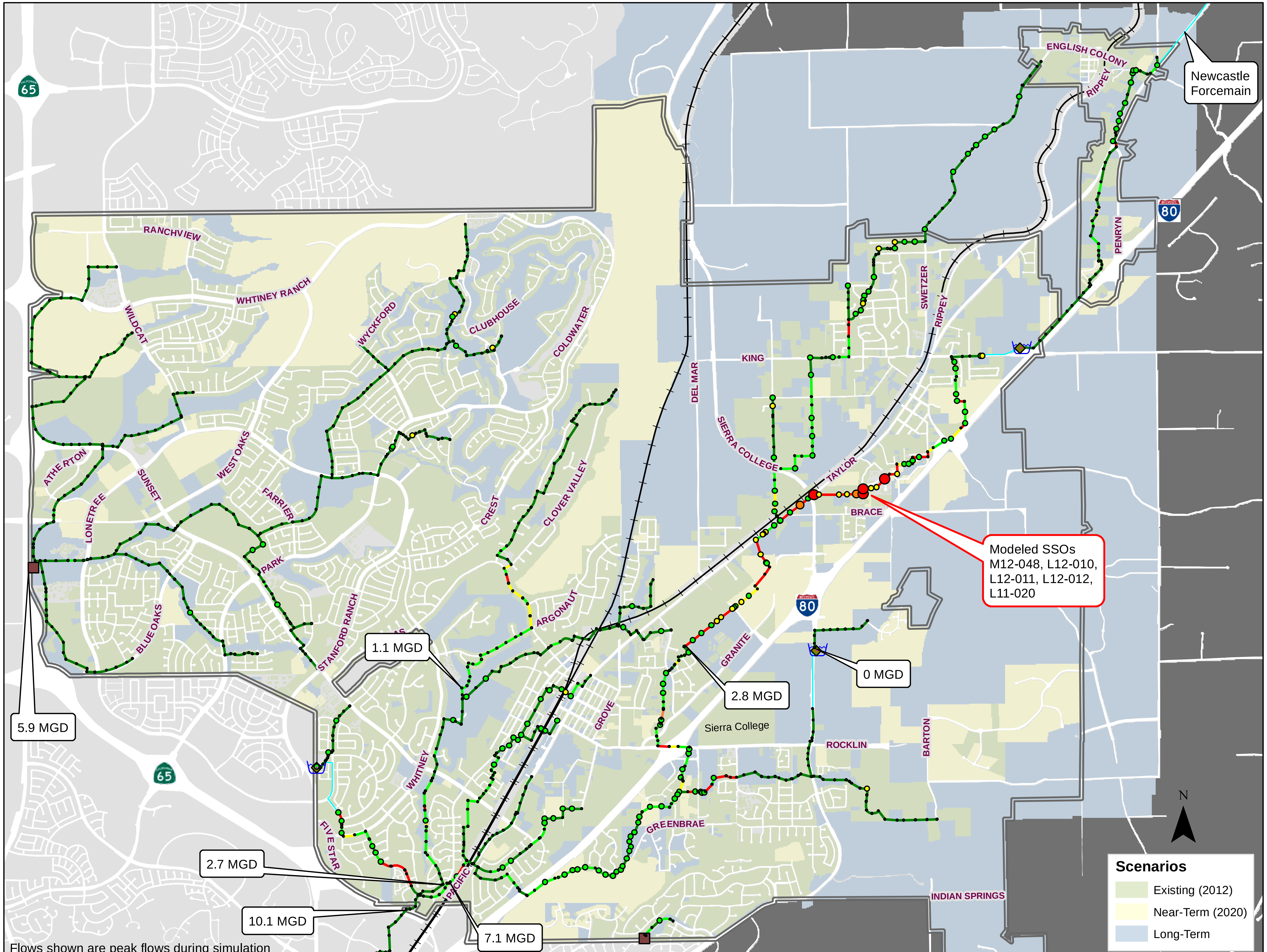
- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99

FIGURE 3

South Placer Municipal Utility District
Wastewater Collection System Model

Existing PWWF

(10-yr, 6-hr Design Storm)



Legend

Manhole

Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

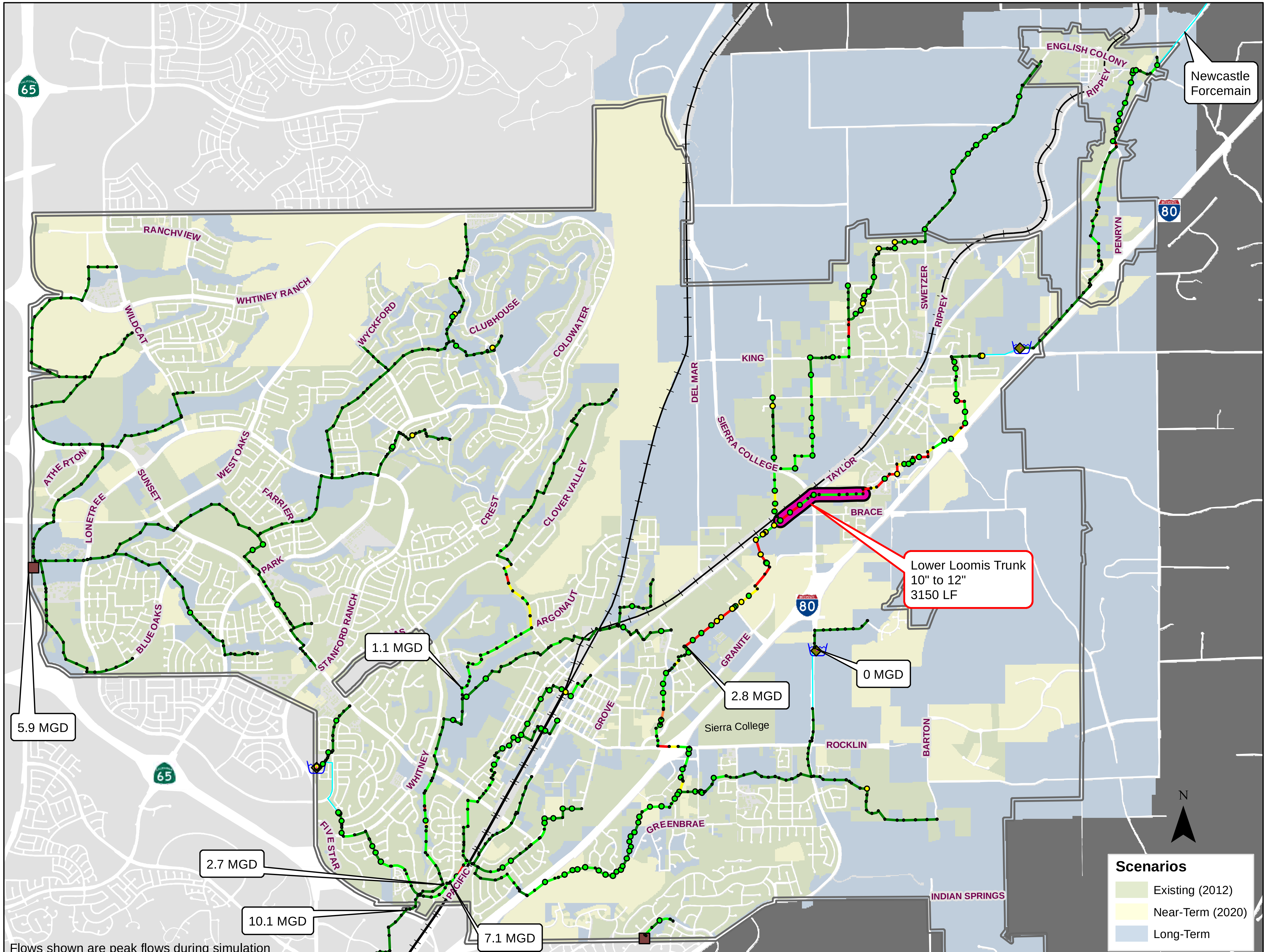
- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99

FIGURE 4

South Placer Municipal Utility District
Wastewater Collection System Model

Existing PWWF

(10-yr, 6-hr Design Storm)
with Proposed Improvements



Legend

Manhole

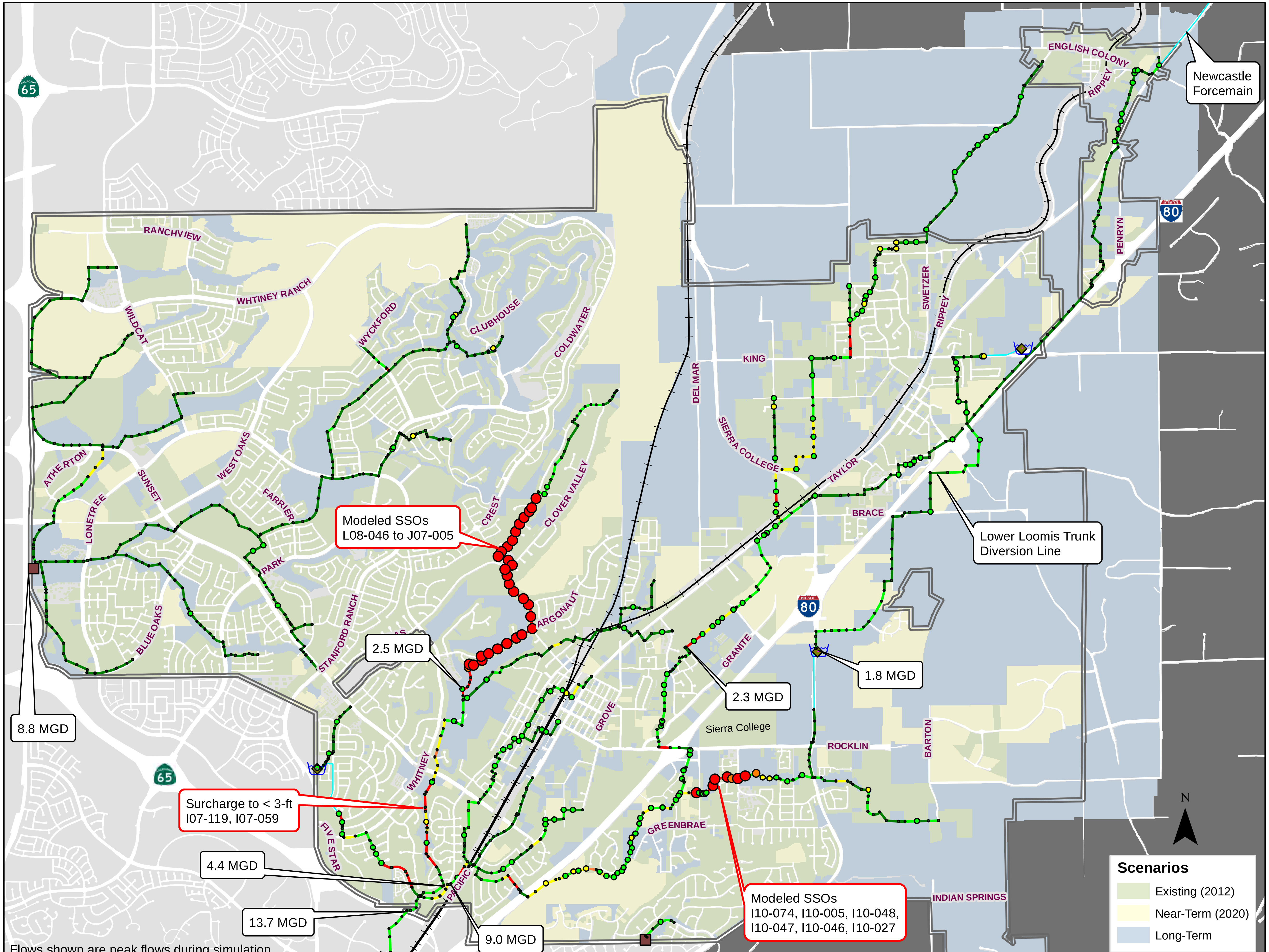
Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99



SOUTH PLACER MUNICIPAL UTILITY DISTRICT

FIGURE 5

South Placer Municipal Utility District
Wastewater Collection System Model

Near-Term PWWF

(10-yr, 6-hr Design Storm)

Legend

Manhole

Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99

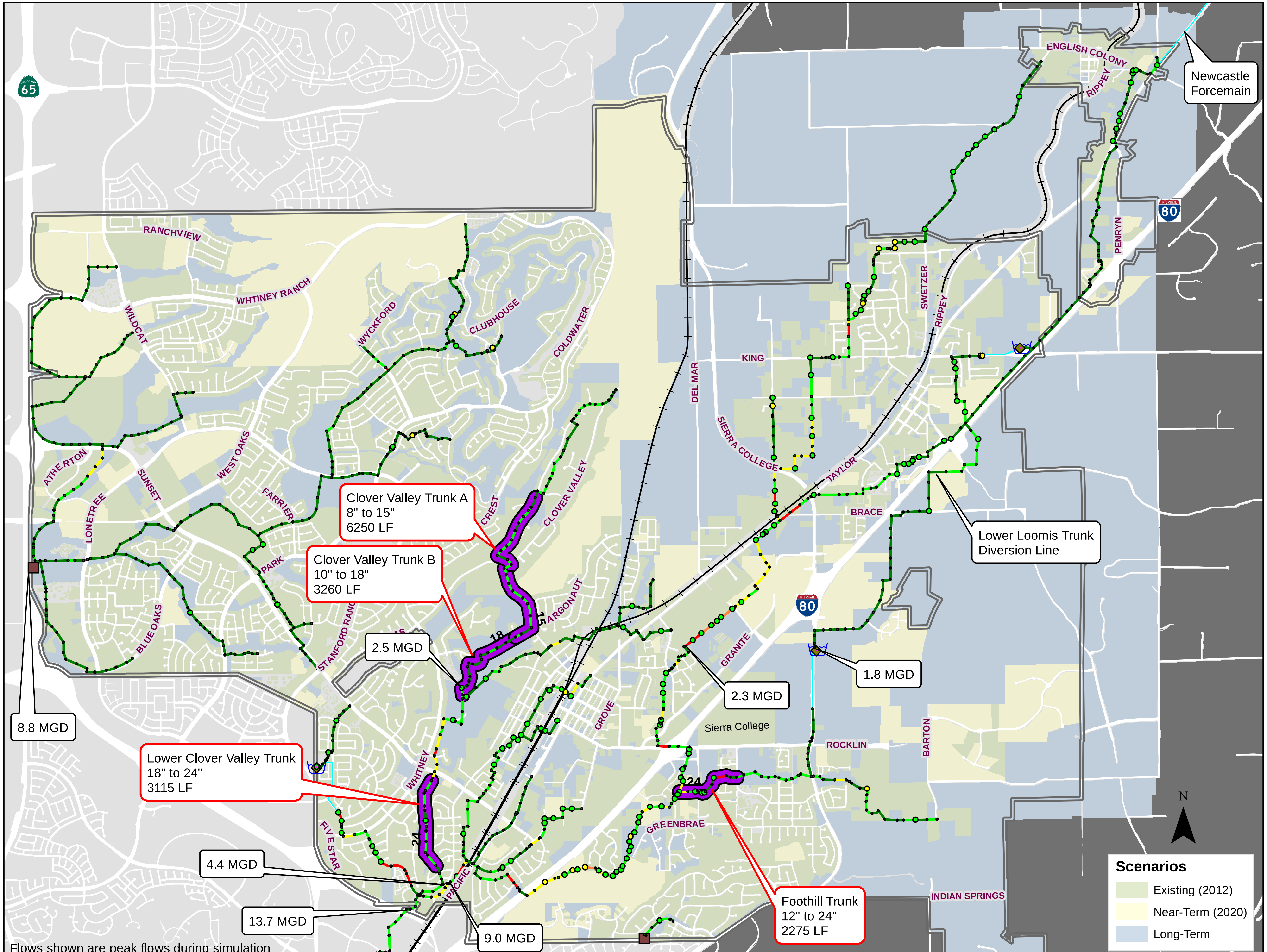


FIGURE 6

South Placer Municipal Utility District
Wastewater Collection System Model

Near-Term PWWF

(10-yr, 6-hr Design Storm)
with Proposed Improvements

Legend

Manhole

Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

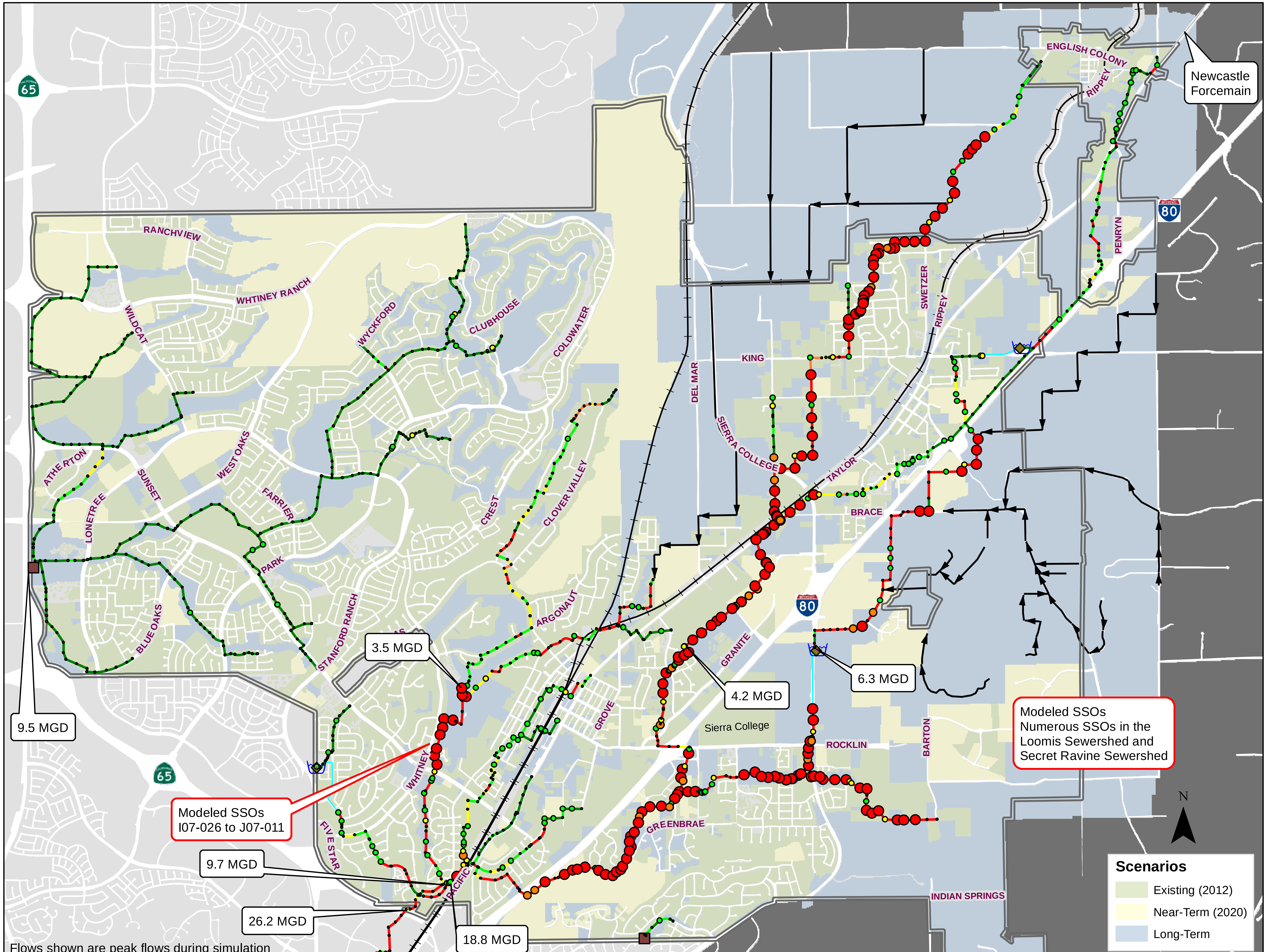
- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99

FIGURE 7

South Placer Municipal Utility District Wastewater Collection System Model

Long-Term PWWF

Lower Bound within the UGA



Legend

Manhole

Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

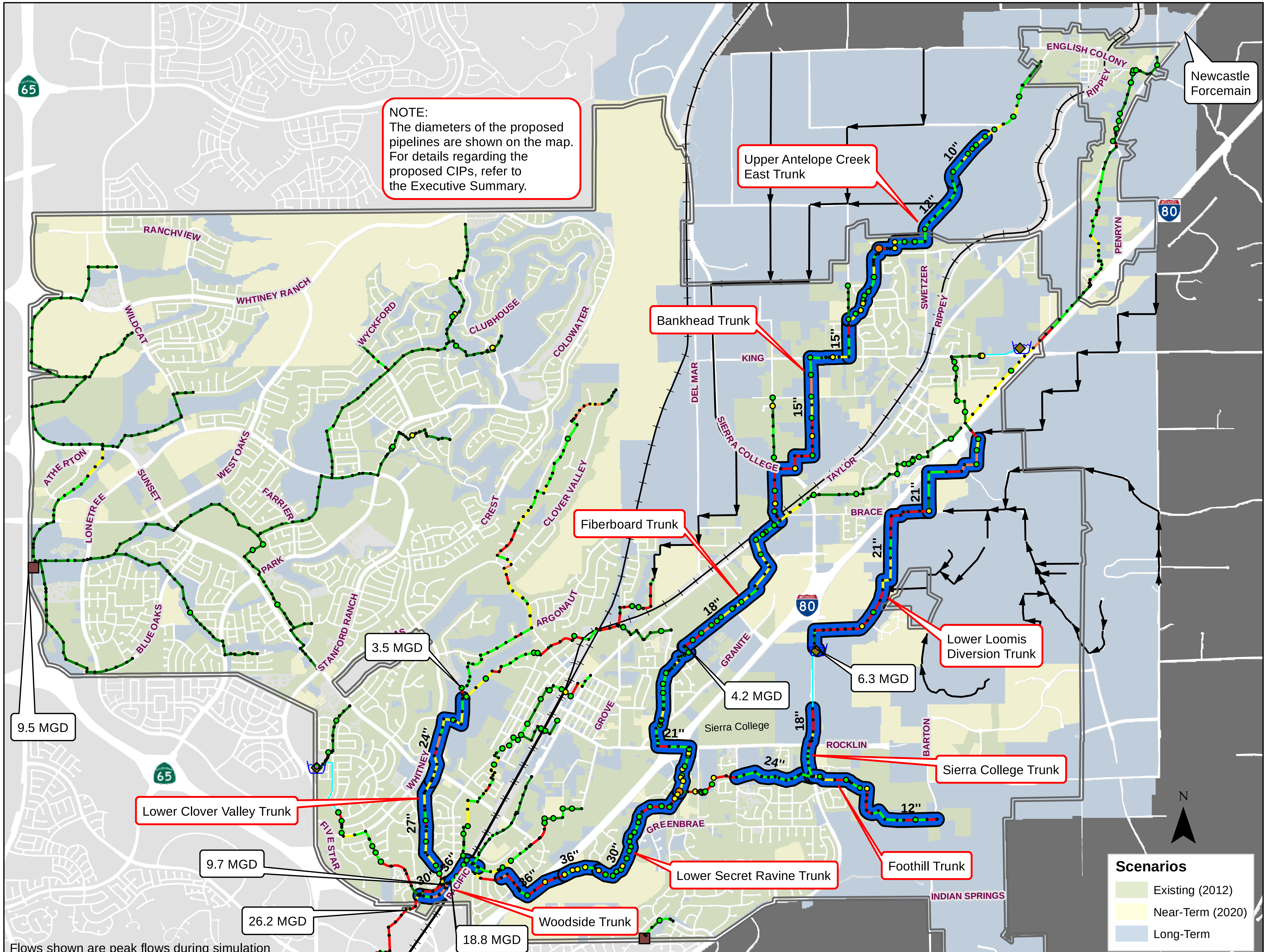
- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99
- Future Trunk Lines

FIGURE 8

Long-Term PWWF

South Placer Municipal Utility District
Wastewater Collection System Model

Lower Bound within the UGA
with Proposed Improvements



Legend

Manhole

Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

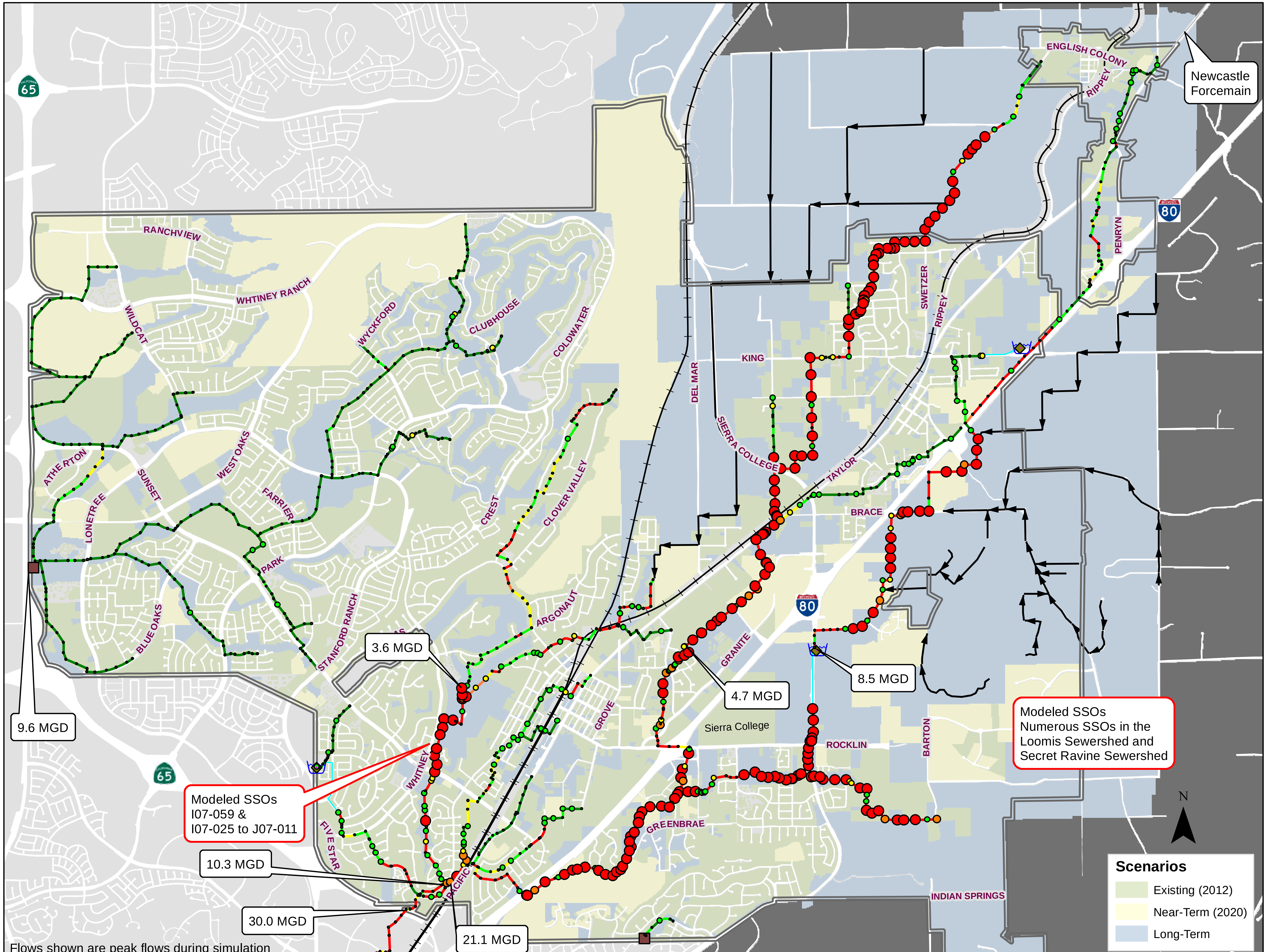
- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99
- Future Trunk Lines

FIGURE 9

South Placer Municipal Utility District
Wastewater Collection System Model

Long-Term PWWF

Upper Bound within the UGA



Legend

Manhole

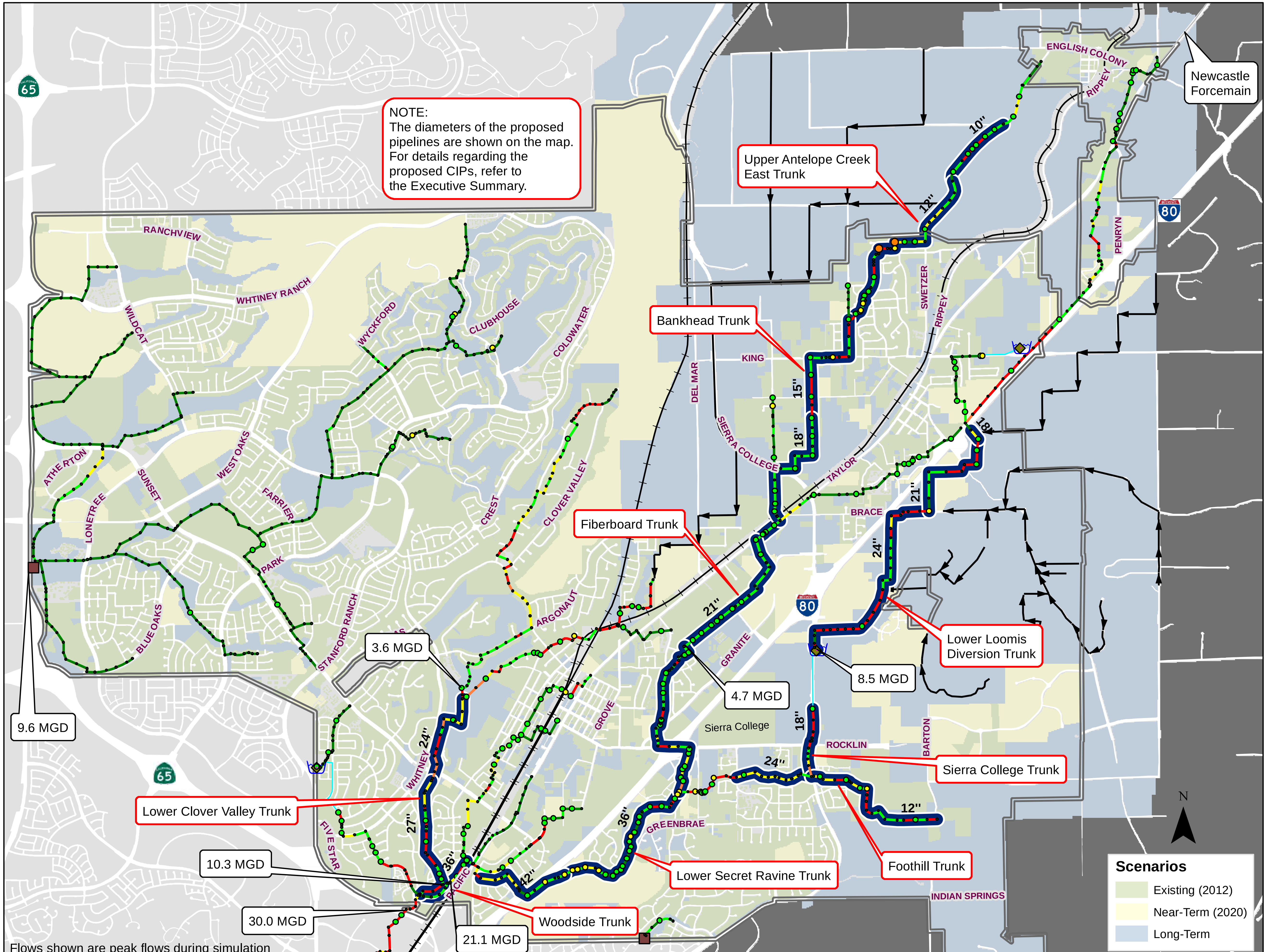
Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99
- Future Trunk Lines



South Placer Municipal Utility District
Wastewater Collection System Model

Long-Term PWWF

Upper Bound within the UGA
with Proposed Improvements

FIGURE 10

Legend

Manhole

Freeboard (ft)

- Less than 0
- 0~1
- 1~3
- 3~6
- Greater than 6

Pipe

Maximum d/D

- Less than 0.5
- 0.5~0.7
- 0.7~0.8
- 0.8~0.99
- Greater than 0.99
- Future Trunk Lines

6.2 Appendix B – Select Profiles of Hydraulic Grade Lines

- Profile 1 – Existing PWWF – Lower Loomis Trunk
- Profile 2 – Existing PWWF – Lower Loomis Trunk with Proposed Improvements
- Profile 3 – Near-Term PWWF – Clover Valley Trunk
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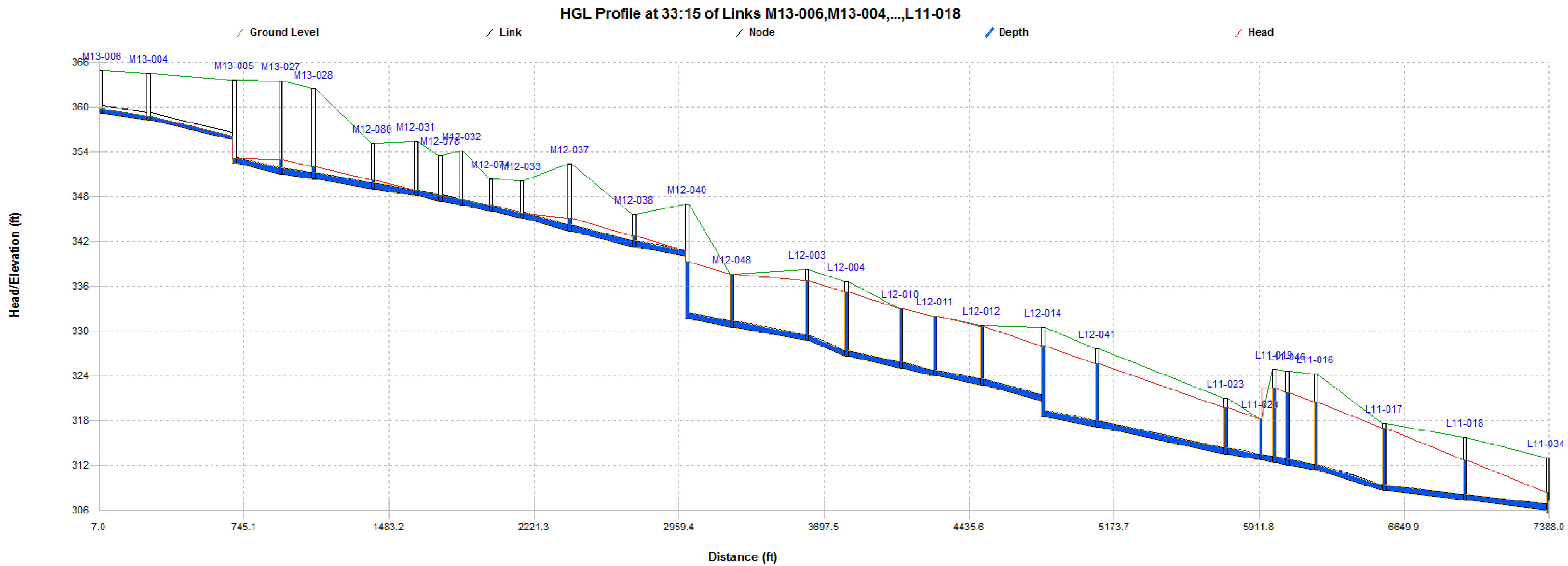
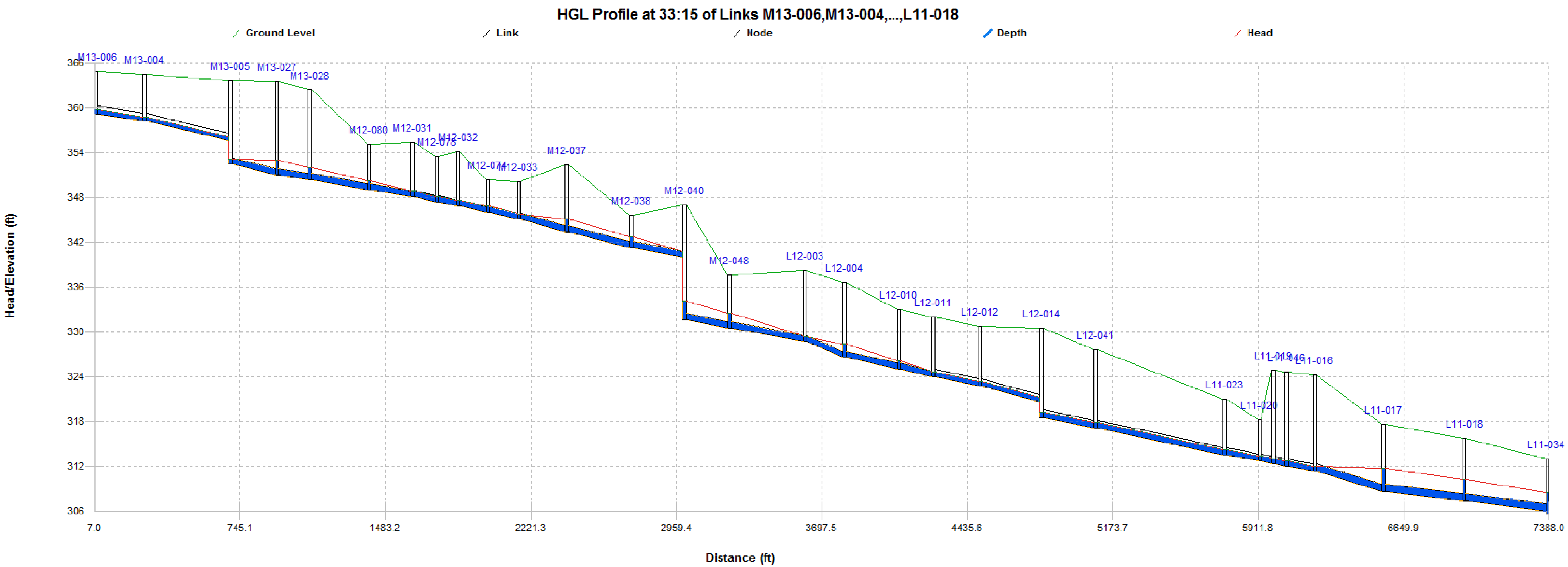
- Profile 8 – Near-Term PWWF – Foothill Trunk with Proposed Improvements

Profile 1 – Existing PWWF – Lower Loomis Trunk

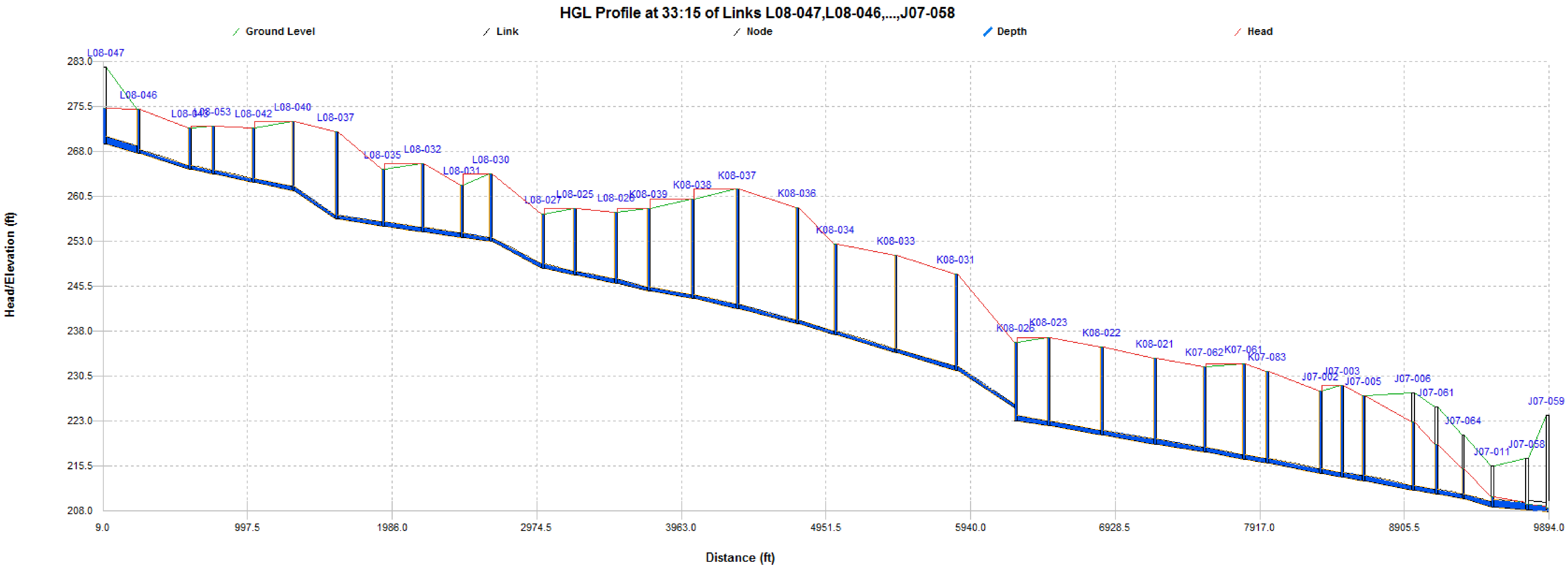


Profile 2 – Existing PWWF – Lower Loomis Trunk

With Proposed Improvements

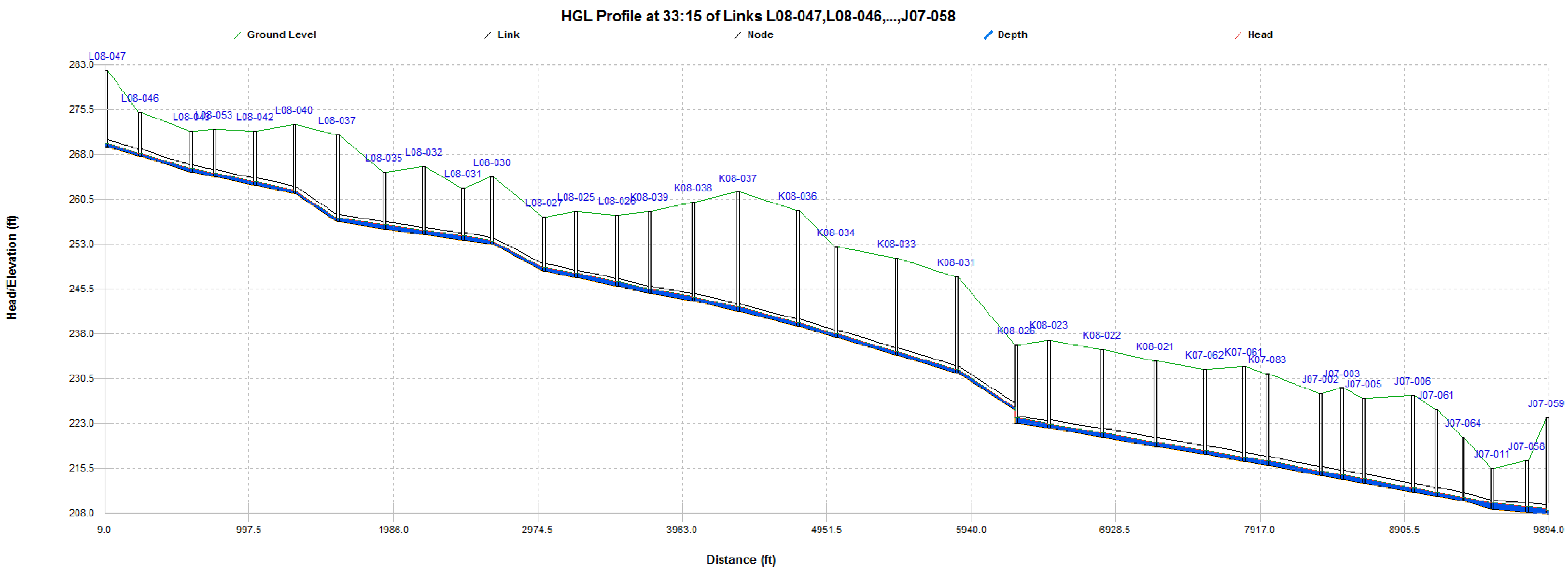


Profile 3 – Near-Term PWWF – Clover Valley Trunk

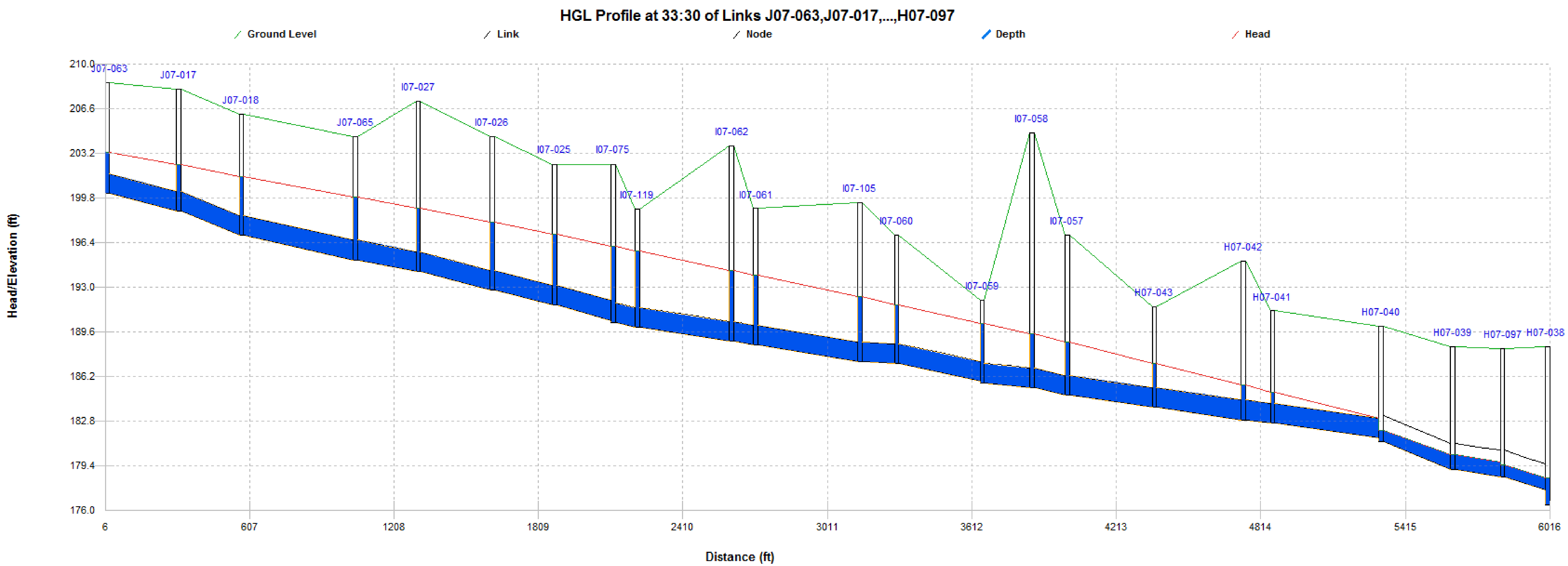


Profile 4 – Near-Term PWWF – Clover Valley Trunk

With Proposed Improvements

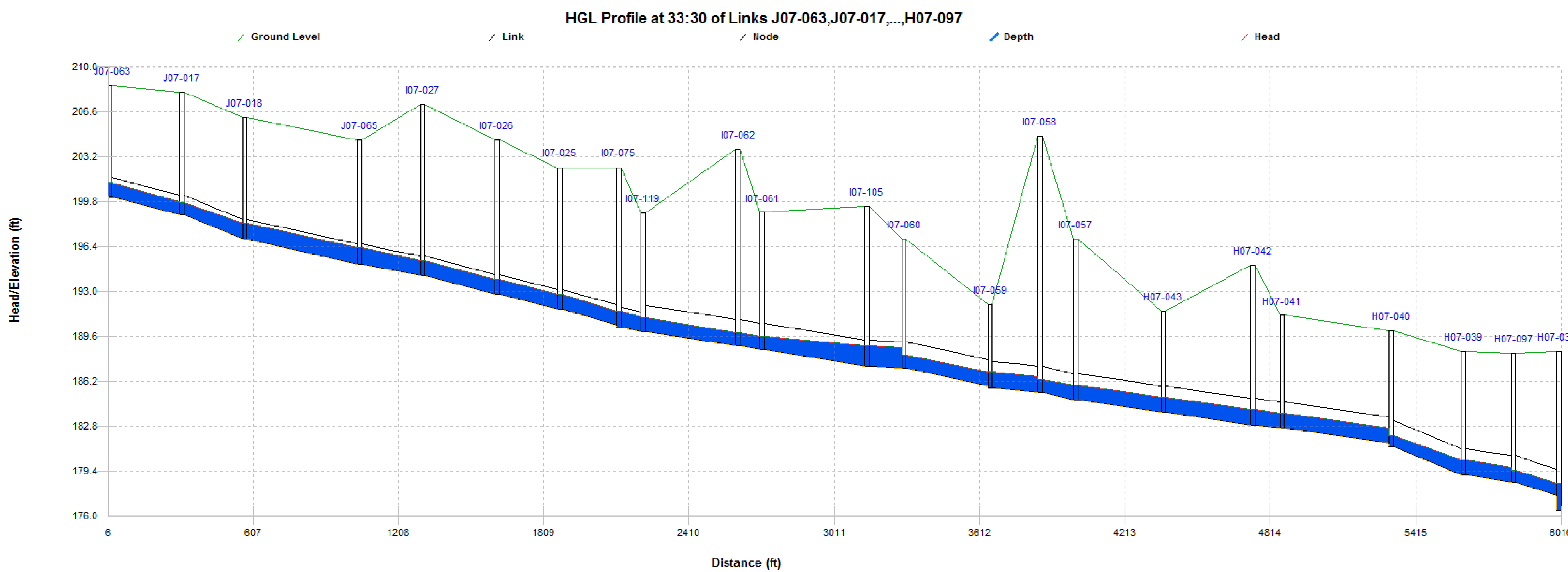


Profile 5 – Near-Term PWWF – Lower Clover Valley Trunk

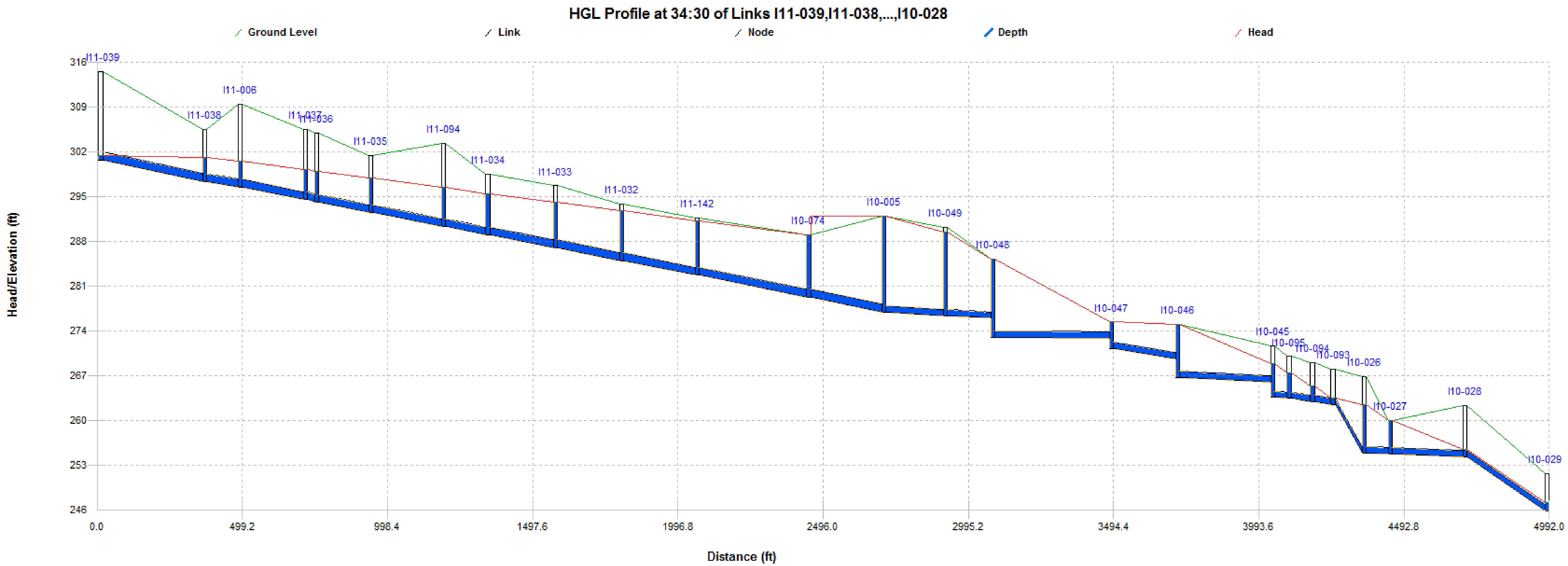


Profile 6 – Near-Term PWWF – Lower Clover Valley Trunk

With Proposed Improvements



Profile 7 – Near-Term PWWF – Foothill Trunk



Profile 8 – Near-Term PWWF – Foothill Trunk

With Proposed Improvements