# B3

## Updated Model Simulated Scenario Descriptions and Results Transmittal, VSVSP

September 3, 2015

## MEMORANDUM

**To:** Chevis Hosea, Squaw Valley Real Estate

**From:** Chad Taylor PG CHg and Maureen Reilly PE

**Re:** Updated Model Simulated Scenario Descriptions and Results Transmittal, Village at Squaw Valley Specific Plan

Assessment of future increases in Squaw Valley groundwater production to supply water for the Village at Squaw Valley Specific Plan (Project) and other future growth has been completed using the most recent version of the Squaw Valley Model, which was also used in the Village at Squaw Valley Specific Plan Water Supply Assessment (WSA, Farr West et. al. 2015). Following completion of the WSA, the Placer County Planning Department (County) requested the development and analysis of additional model simulations to evaluate increased occupancy rates and fewer new wells.

Five model simulations were completed, as described below:

1. **Baseline Conditions** – The first simulation was the Baseline condition representing current average pumping in Olympic Valley with distribution to the existing wells at the historical average distribution rate.
2. **Cumulative Conditions with Nine New Wells** – The first future simulation included all Project and non-Project demand produced from an expanded wellfield with nine new wells in addition to the existing Squaw Valley Public Service District (SVPSD) and Squaw Valley Mutual Water Company (SVMWC) wells. This is the same wellfield that was simulated in the WSA (Farr West et. al. 2015). Cumulative future water demands were estimated by MacKay and Somps and Farr West Engineering by increasing the occupancy rates used in the WSA by 5 percent per month for an average annual occupancy rate averaging 61.3 percent. The resulting demands are shown in Table 1. These cumulative water demands were distributed to the existing and new wells in the wellfield shown on Figure 1 as described in the WSA (Farr West et. al. 2015).
3. **Cumulative Conditions with Six New Wells** – This simulation used the same demands as the previous scenario (Table 1), with pumping from the existing wells plus six new wells, which is the minimum number of new wells indicated by the WSA. The six new well locations were selected to take advantage of the best hydrogeologic conditions and fewest obstacles to well construction and operation. The new well locations include a well on the PlumpJack property; redevelopment of this property is currently in planning, and the well location has been identified by

PlumpJack and the SVPSD. The locations of the six new wells simulated in this scenario are shown on Figure 2.

4. **Project Only Conditions** – This simulation included pumping to meet existing and Project water demand from a slightly expanded wellfield including four new wells to meet Project Only demands. Monthly demands were distributed to a slightly expanded wellfield including four new wells as shown in Figure 3. This is the same wellfield that was used in the Potential Impacts of Increased Groundwater Pumping on Squaw Creek Fisheries and Aquatic Resources Technical Memorandum prepared by Garcia and Associates (GANDA 2014).
5. **Non-Project Only Conditions** – The third future simulation included existing and Non-Project demand production from the existing wellfield plus a single new well and the Resort at Squaw Creek (RSC) wells for the RSC Phase 2 expansion. SVPSD and SVMWC demands were distributed to the existing western wellfield at the current average distribution rates, to the new well at the average existing rate, and to the RSC wells according to the existing Development Agreement between SVPSD and RSC (Farr West et. al. 2015, GANDA 2014). The locations of the wells simulated in this scenario are shown on Figure 4.

## MODEL SIMULATED GROUNDWATER ELEVATIONS

Model simulated groundwater elevations from the five scenarios described above are presented in the following ways:

- The results of the two cumulative water demand simulations were compared to the sufficiency of supply criteria developed and applied in the WSA (Farr West et. al. 2015). Only the cumulative demand simulations were evaluated against the sufficiency of supply criteria because these scenarios represent the largest demand increases.
- Simulated groundwater elevations for all scenarios were extracted from the stream cell locations that were used by GANDA and in the Draft Environmental Impact Report (DEIR).

### Cumulative Demands Compared to Sufficiency of Supply Criteria

The percent saturation results for the cumulative demand simulations using nine new wells and six new wells are shown in Figures 5 and 6, respectively. In both of these simulations the minimum percent saturated thickness results are above the 65 percent criteria, as was the case in the WSA. Neither the increased demands nor the reduced number of wells resulted in a failure to meet the sufficiency of supply criteria. The increased occupancy rate with nine new wells does indicate a slightly lower average percent saturation than the lower occupancy rate simulation presented in the WSA. The percent saturation for the cumulative demand simulation with six new wells indicates higher percent saturation results as compared to the cumulative demand simulation with nine new wells. This is because the wells simulated in the six new well version are located in thicker and more productive areas

of the aquifer. The nine new well simulations include wells located in thinner areas of the aquifer where percent saturation is more affected pumping.

**Model Simulated Groundwater Elevations in Stream Cells**

Groundwater elevations from were extracted from the model for selected locations in the stream for each of the five scenarios described above for each month of the model period from October 1992 through the end of December 2014. The stream cell locations are the same as those used in the DEIR and the assessment by Ganda (2014). The locations and designations of these cells are shown on Figures 7 and 8. Two versions of the creek are shown to account for the modifications to the creek planned in the restoration associated with the project. This restoration work includes changes to the existing streambed in the trapezoidal channel area. The elevations of the streambed resulting from this modification have been included in the two cumulative simulations and the Project Only simulation.

Model simulated groundwater elevation data for the stream cells are included in the Microsoft Excel workbooks titled *Squaw Creek West Model Simulated Groundwater Elevation Data.xlsx* and *Squaw Creek East Model Simulated Groundwater Elevation Data.xls.*

## REFERENCES

Farr West Engineering, HydroMetrics WRI, and Todd Groundwater, 2015, Village at Squaw Valley Specific Plan Water Supply Assessment Update, July 2015.

Garcia and Associates (GANDA), 2014, Potential Impacts of Increased Groundwater Pumping on Squaw Creek Fisheries and Aquatic Resources, Village at Squaw Valley Specific Plan Project, September 2014.

# TABLES

## Table 1. Average Year Total Demand by Month at 2040

**All values in Acre-Feet**

| Month | Squaw Valley Public Services District (SVPSD)[1] | | | | | Squaw Valley Mutual Water Company (SVMWC)[2] | | Resort at Squaw Creek[3] | | Squaw Valley Resort Snowmaking[4] | Total Average Year Demand by Month | Average Horizontal Well Production[5] | | | Demand from Olympic Valley Groundwater Basin[6] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing Demand | Project Demand | New Single Family Demand | New Resort, Hotel, Condo, & Commercial Demand | Resort at Squaw Creek Phase 2 Potable Demand | Existing Demand | New Single Family Demand | Golf Course Irrigation (after Phase 2) | Snowmaking (after Phase 2) | | | SVPSD | SVMWC | Total | |
| January | 26 | 22 | 5 | 4 | 4 | 6 | 1 | 0 | 21 | 23 | 112 | 1 | 4 | 5 | 107 |
| February | 28 | 23 | 6 | 4 | 4 | 6 | 1 | 0 | 19 | 16 | 106 | 1 | 3 | 5 | 102 |
| March | 27 | 25 | 5 | 4 | 4 | 7 | 1 | 0 | 0 | 0 | 73 | 2 | 4 | 6 | 68 |
| April | 22 | 20 | 3 | 3 | 2 | 6 | 1 | 0 | 0 | 0 | 56 | 2 | 4 | 6 | 50 |
| May | 29 | 18 | 3 | 2 | 3 | 10 | 1 | 6 | 0 | 0 | 73 | 3 | 4 | 7 | 65 |
| June | 45 | 21 | 5 | 3 | 4 | 16 | 1 | 28 | 0 | 0 | 122 | 4 | 3 | 7 | 115 |
| July | 58 | 27 | 10 | 4 | 5 | 20 | 2 | 46 | 0 | 0 | 171 | 3 | 3 | 7 | 165 |
| August | 57 | 28 | 9 | 4 | 5 | 20 | 1 | 36 | 0 | 0 | 162 | 3 | 3 | 6 | 155 |
| September | 44 | 21 | 7 | 3 | 4 | 18 | 1 | 23 | 0 | 0 | 121 | 2 | 3 | 6 | 115 |
| October | 26 | 18 | 5 | 3 | 3 | 10 | 1 | 6 | 1 | 1 | 72 | 2 | 3 | 5 | 67 |
| November | 15 | 14 | 3 | 2 | 2 | 5 | 0 | 0 | 27 | 19 | 86 | 1 | 3 | 4 | 82 |
| December | 24 | 21 | 4 | 3 | 3 | 6 | 1 | 0 | 27 | 30 | 119 | 1 | 4 | 5 | 114 |
| **TOTALS** | **403** | **255** | **64** | **39** | **43** | **130** | **10** | **145** | **94** | **89** | **1,273** | **26** | **42** | **68** | **1,204** |

***Notes:***

General : - All values from Table 2 of Farr West 2015; VSVSP and SVPSD New Resort, Hotel, Condo, & Commercial water demands increased from Farr West 2015 by 5 percent per month.
- All values rounded to nearest whole number, totals may reflect the effects of rounding.

1 : SVPSD demands include Village at Squaw Valley demand estimate, current demands, non-project single family residential and commercial/multifamily demands, and the Resort at Squaw Creek Phase 2 potable water demands.

2 : SVMWC cumulative demands include current demand and new single family residential demands.

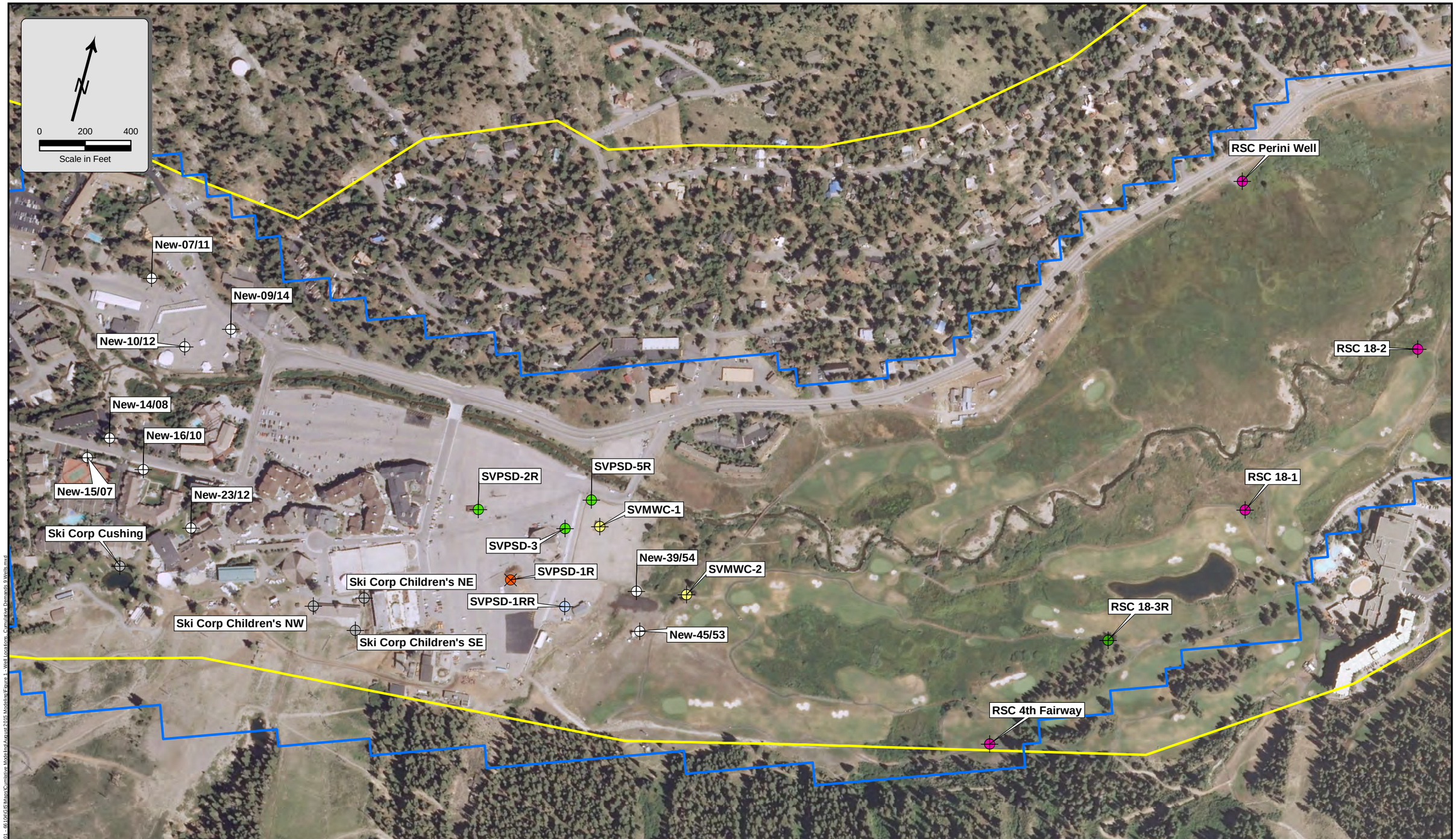
3 : RSC non-potable demands at 2040 assumed to be equivalent to the existing Development Agreement with SVPSD.

4 : Resort snow making volume and seasonal distribution supplied from the Olympic Valley Aquifer in 2040 assumed to be the same as recent historical averages plus a growth factor of 10 percent.

5 : 2000 to 2014 average production reported by SVPSD and SVMWC.

6 : Olympic Valley Groundwater Basin demand calculated by subtracting Total Average Horizontal Well Production from Total Demand column.

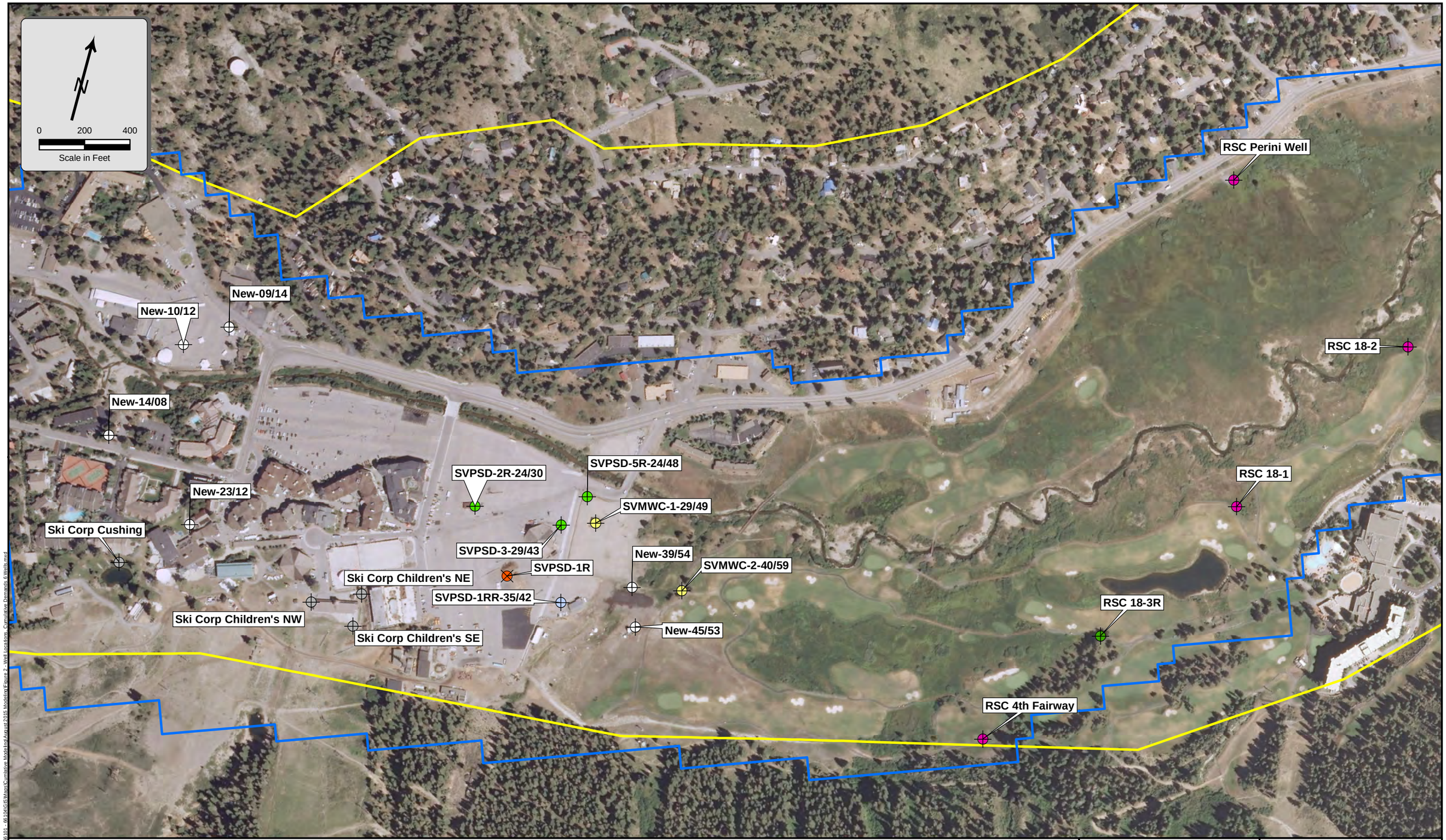
# FIGURES




September 2015

TODD GROUNDWATER

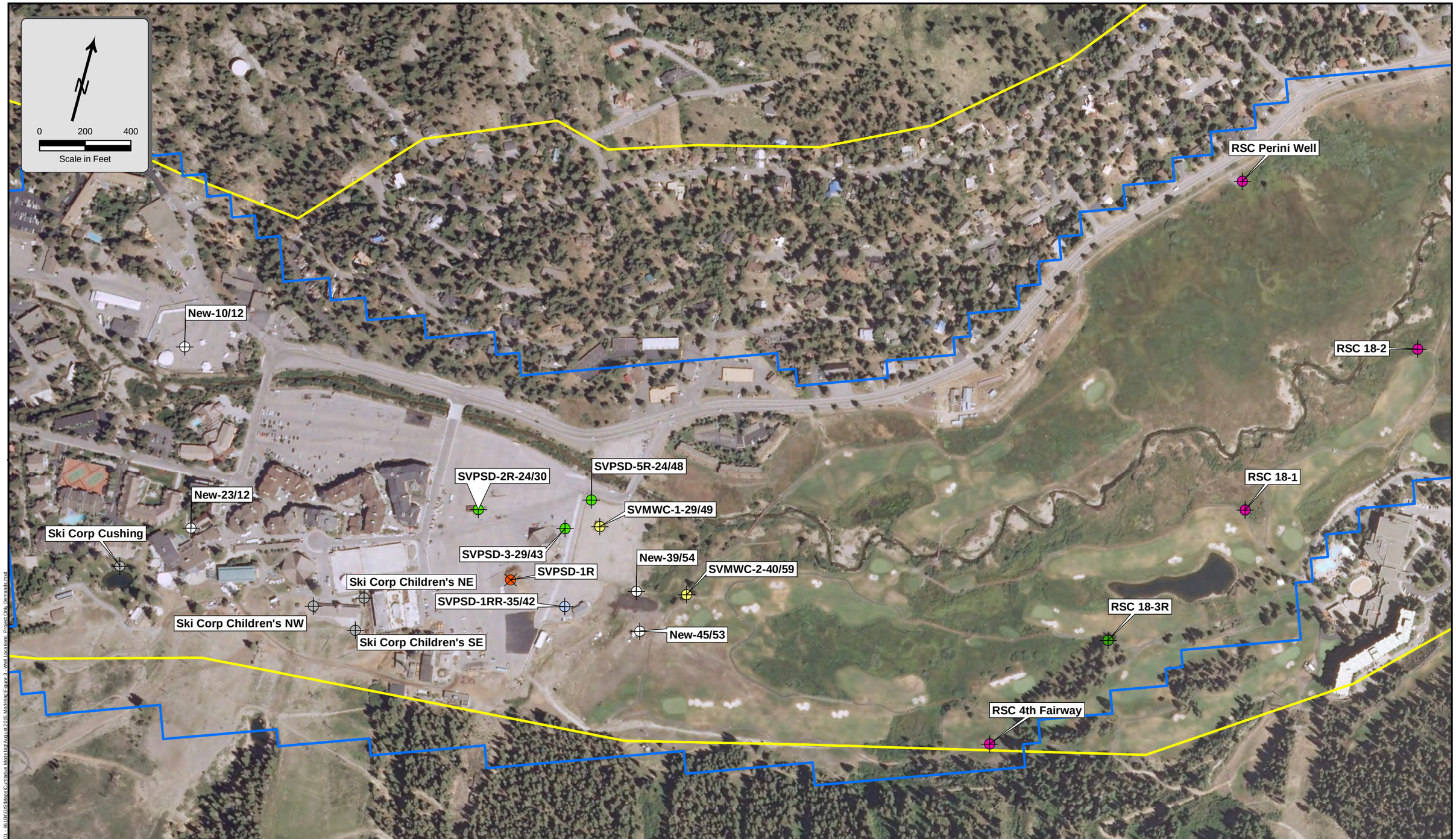
**Figure 1**
**Existing and New Wells Cumulative Demands with 9 New Wells**




September 2015

TODD GROUNDWATER

**Figure 2**
**Existing and New Wells Cumulative Demands with 6 New Wells**

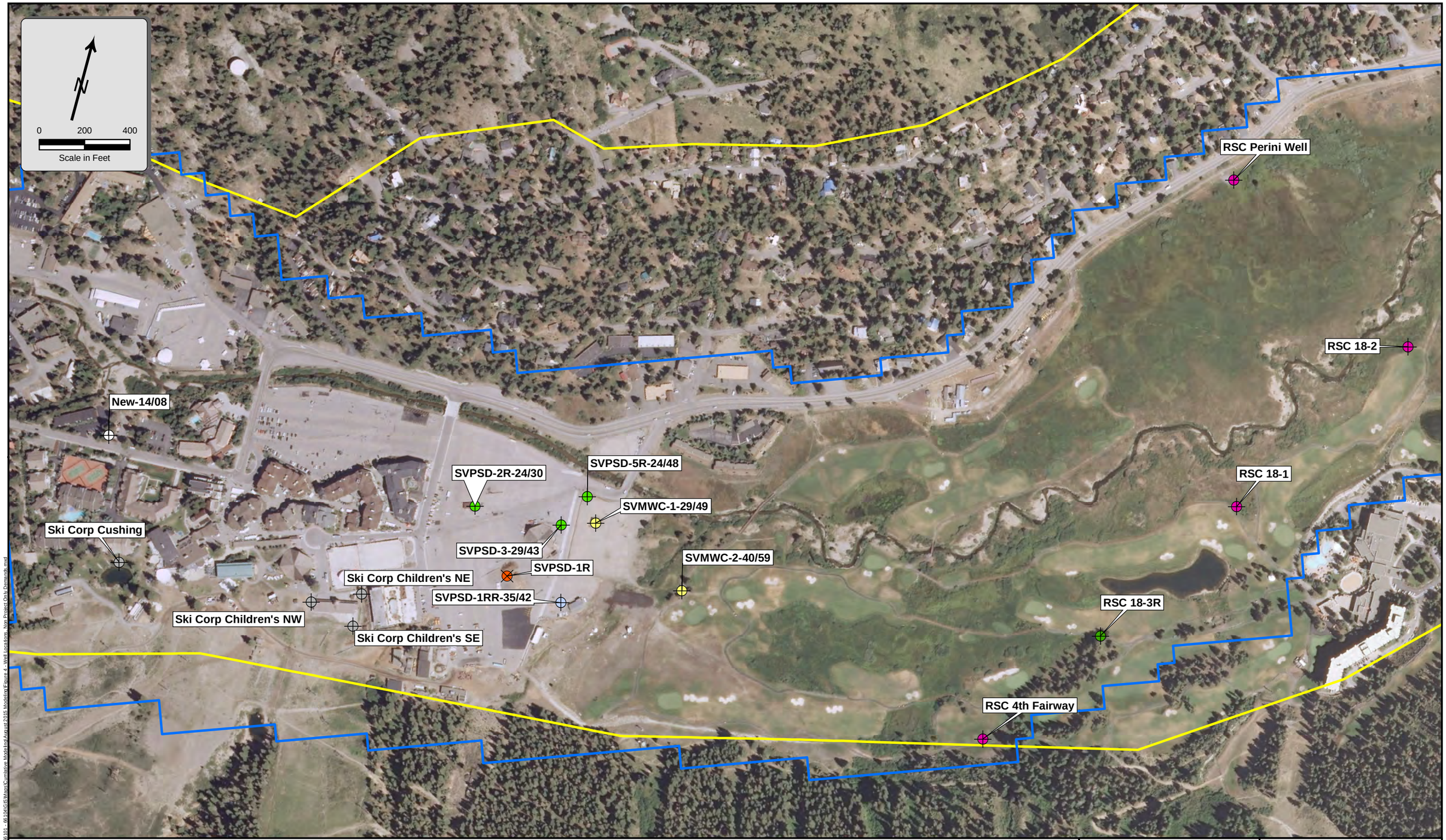



Proposed New Well
PSD Replacement Well
Existing PSD Well to Remain
Existing MWC Well to Remain
Squaw Valley Resort Well
Resort at Squaw Creek 18-3R
Resort at Squaw Creek Irrigation/Snowmaking Well
Well To Be Destroyed
Active Model Area
Olympic Valley Groundwater Basin

September 2015

TODD GROUNDWATER

**Figure 3**
**Existing and New Wells**
**Project Only Demands**
**with 4 New Wells**




Proposed New Well
PSD Replacement Well
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Squaw Valley Resort Well
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Active Model Area
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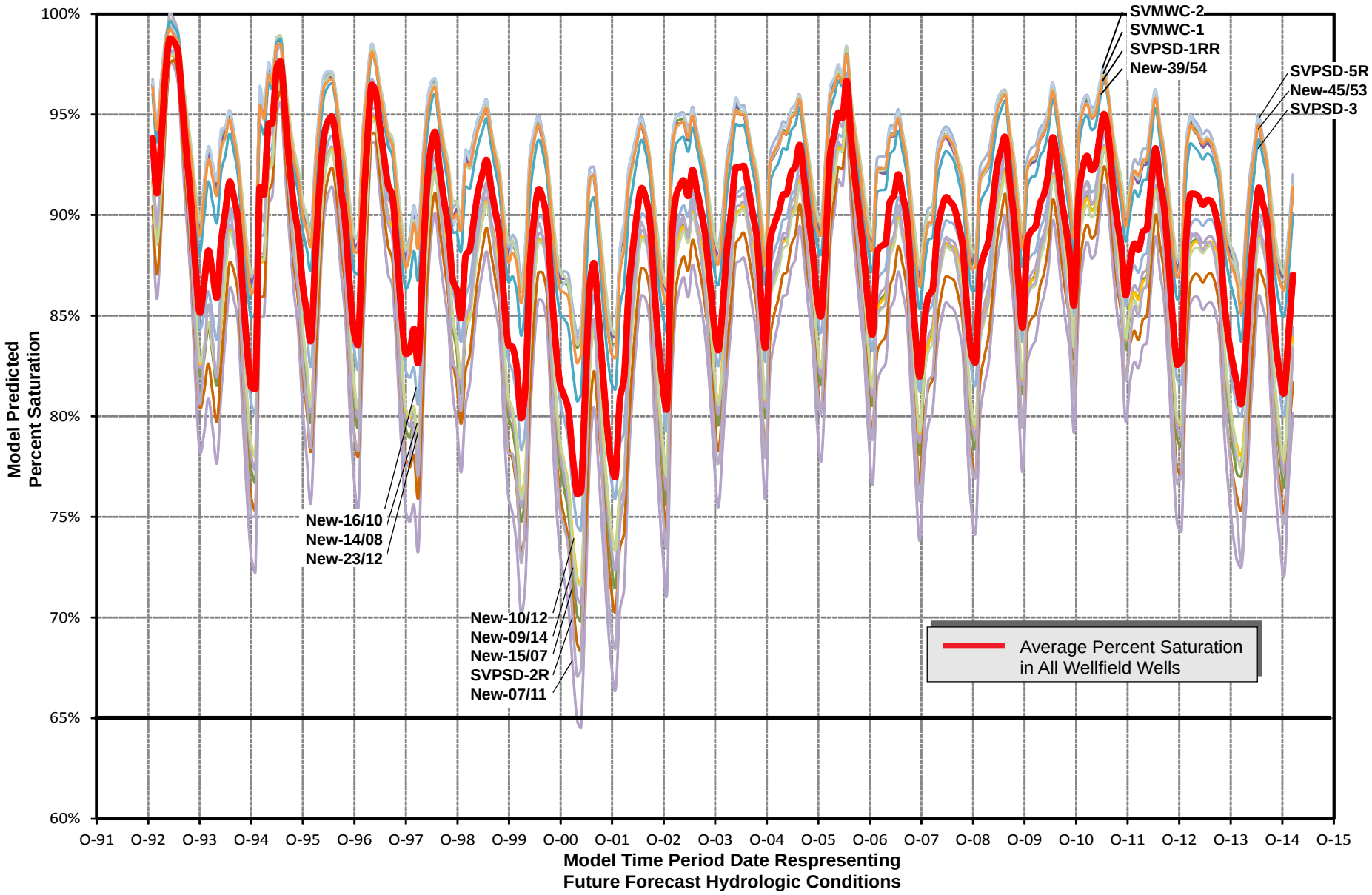
September 2015

TODD GROUNDWATER

**Figure 4**
**Existing and New Well Non Project Only Demands**




September 2015

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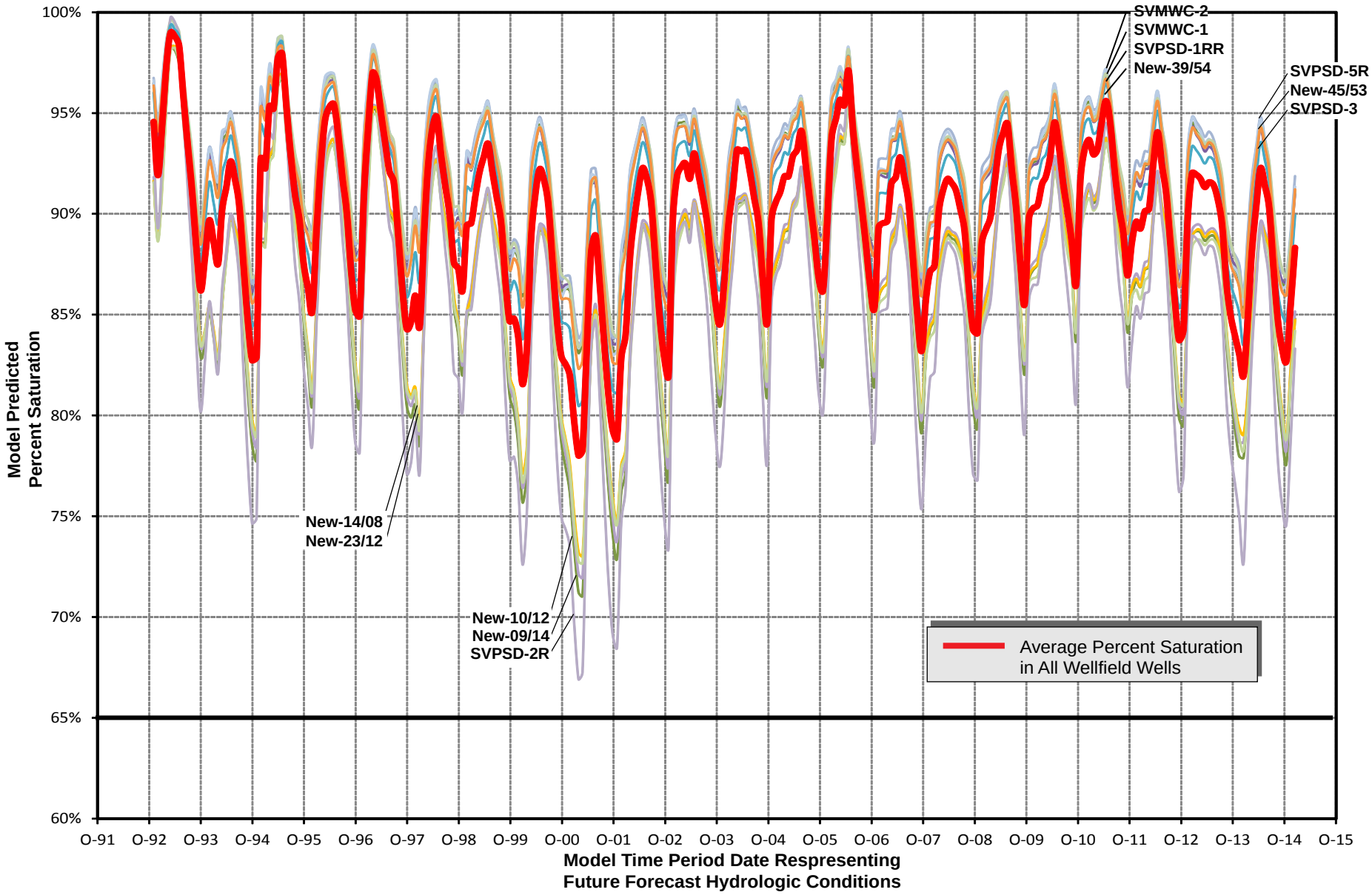
**Figure 5**
**Percent Saturation**
**All Wellfield Wells at 2040**
**61.3 Percent Occupancy**
**9 New Wells**




September 2015

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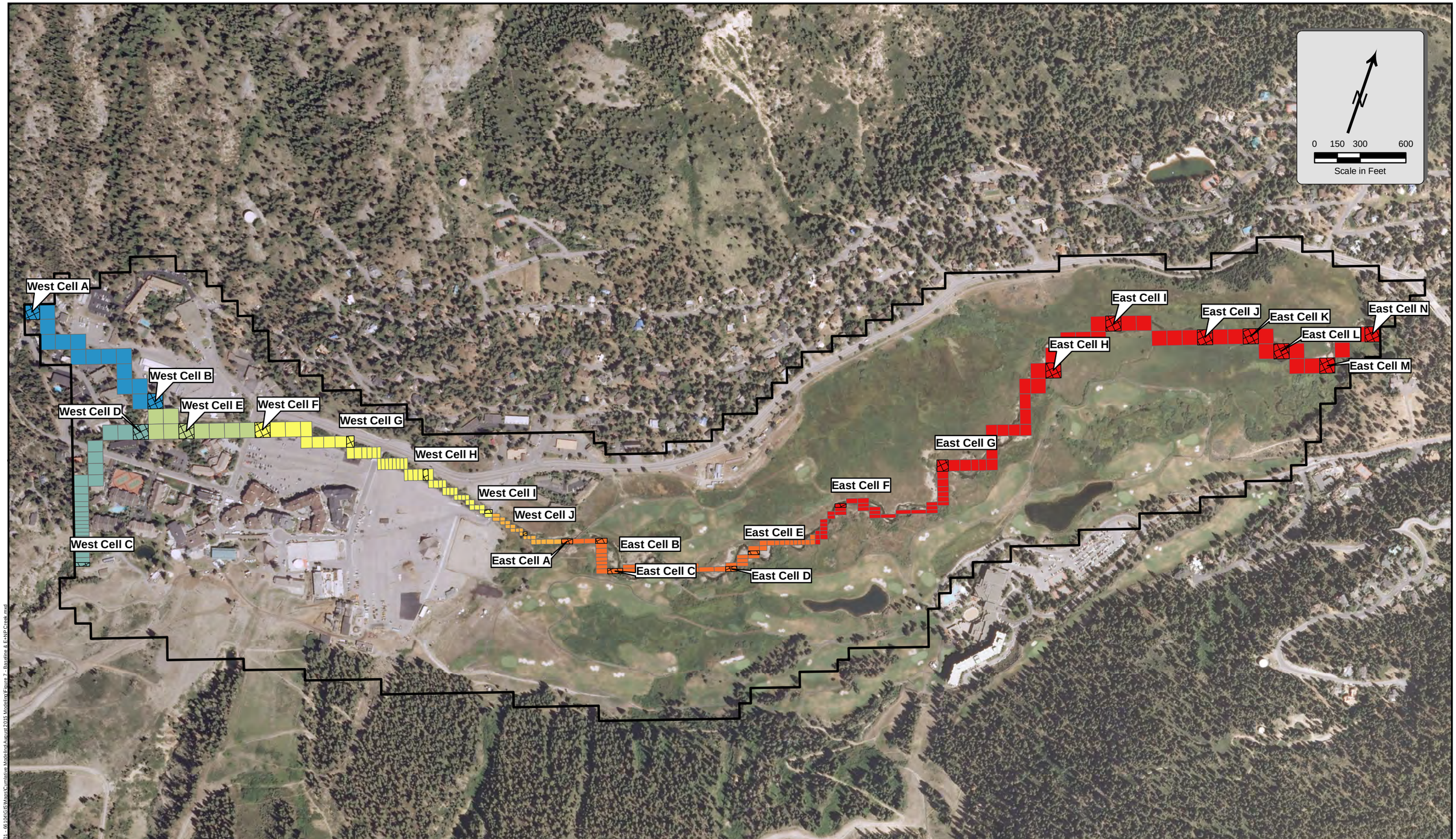
**Figure 6**
**Percent Saturation**
**All Wellfield Wells at 2040**
**61.3 Percent Occupancy**
**6 New Wells**



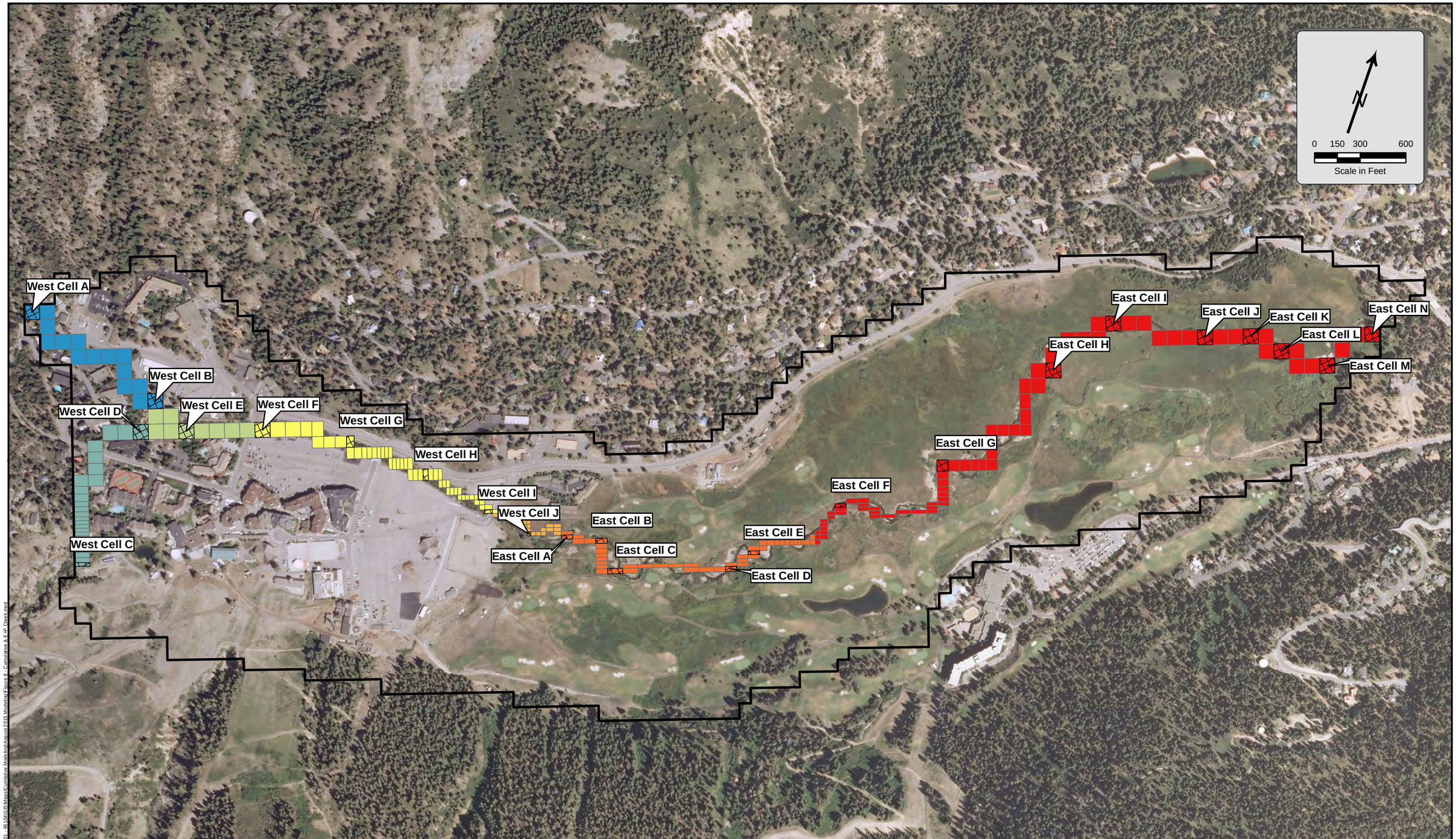

***Legend***

- North Fork
- South Fork
- Main 1 (West)
- Main 2 (West)
- Main 3 (West)
- Main 4 (East)
- Main 5 (East)
- Model Stream Cells
- Active Model Area

September 2015

TODD GROUNDWATER

**Figure 7**
**Squaw Creek in Model Baseline and Existing + Non-Project**




***Legend***

- North Fork
- South Fork
- Main 1 (West)
- Main 2 (West)
- Main 3 (West)
- Main 4 (East)
- Main 5 (East)
- Model Stream Cells
- Active Model Area

September 2015

TODD GROUNDWATER

**Figure 8**
**Squaw Creek in Model Cumulative and Existing + Project**